

A SURE
GUIDE TO
PHYSICK AND
CHYRURGERY
—
RIOLAN

1657

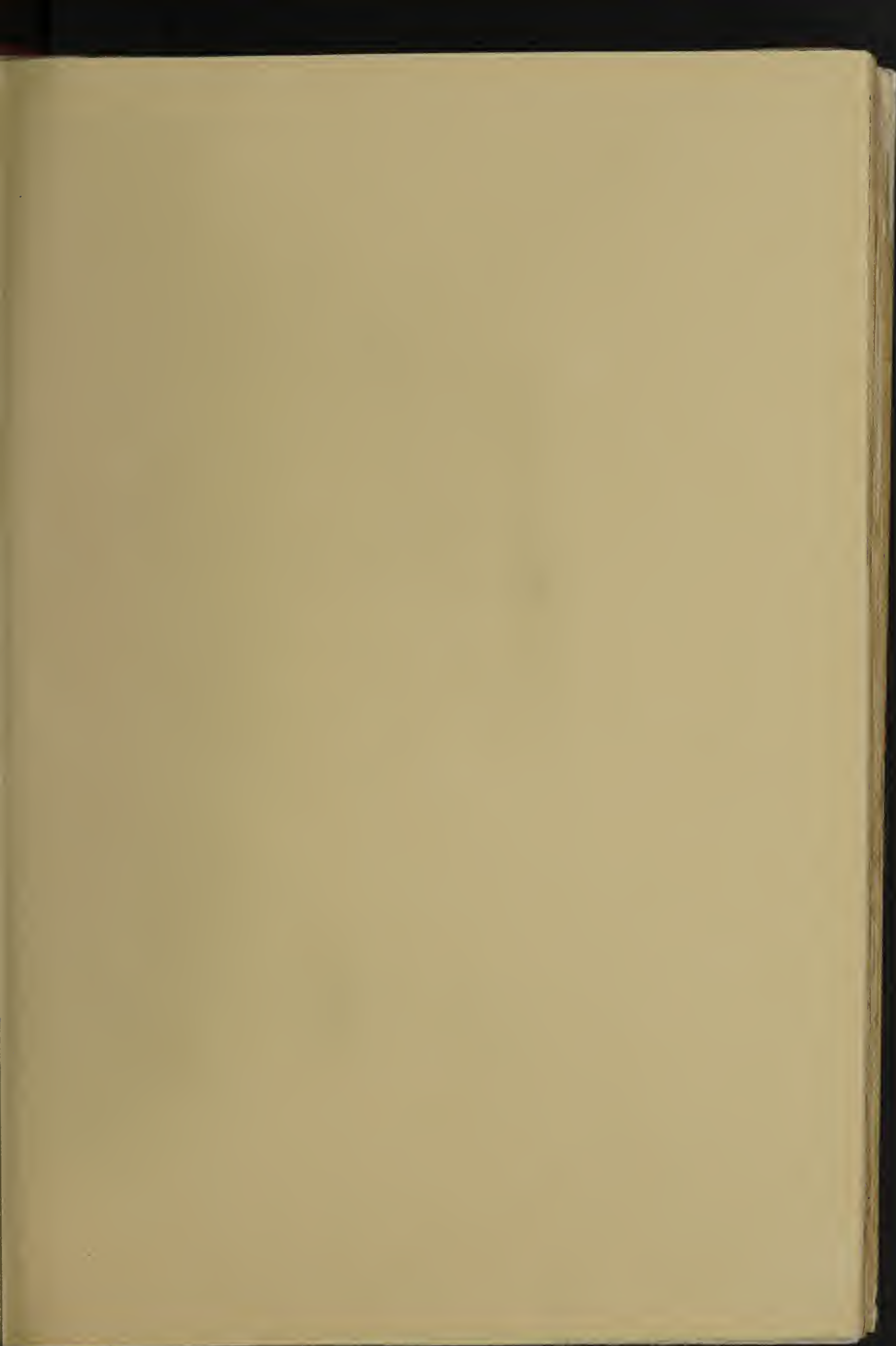


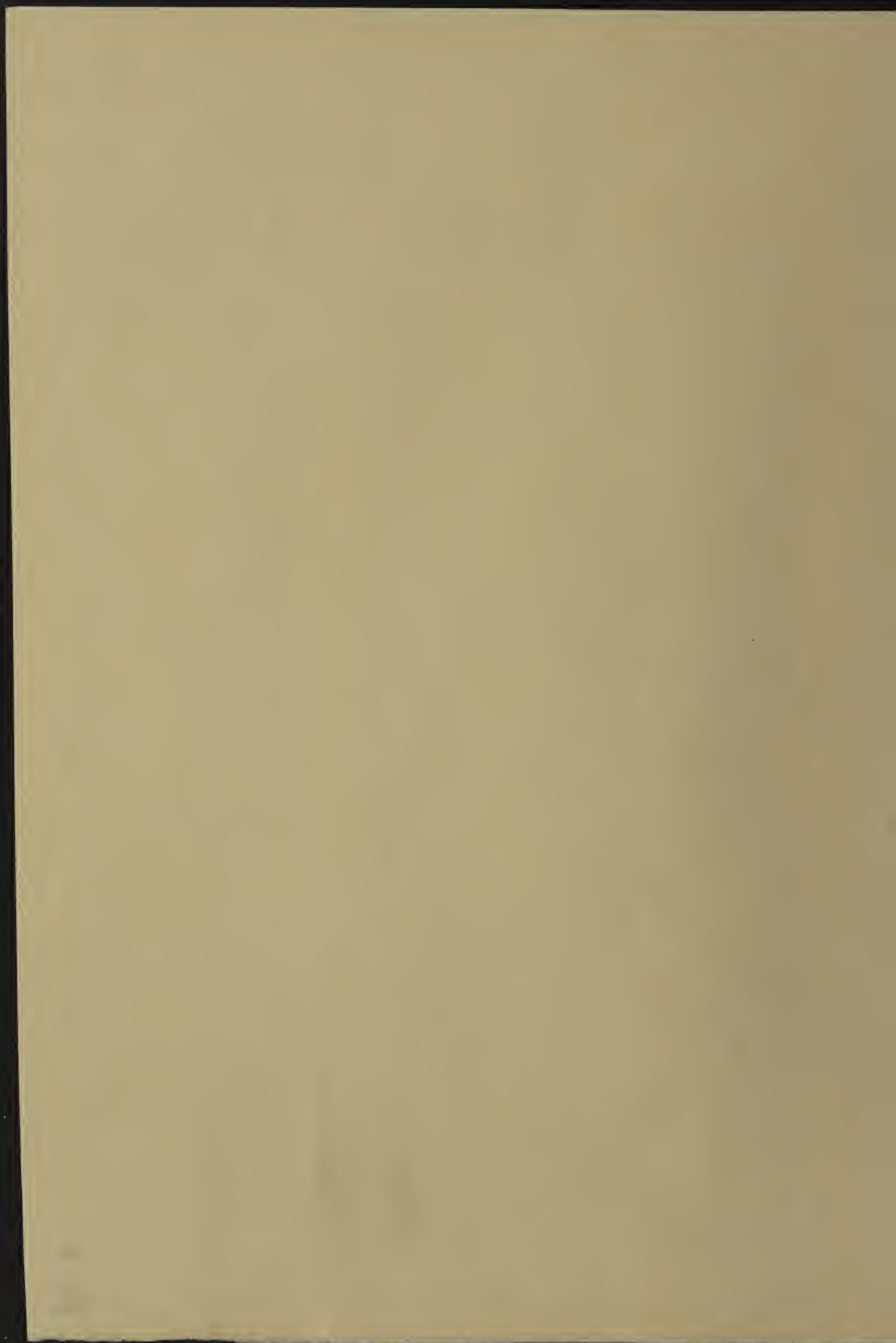


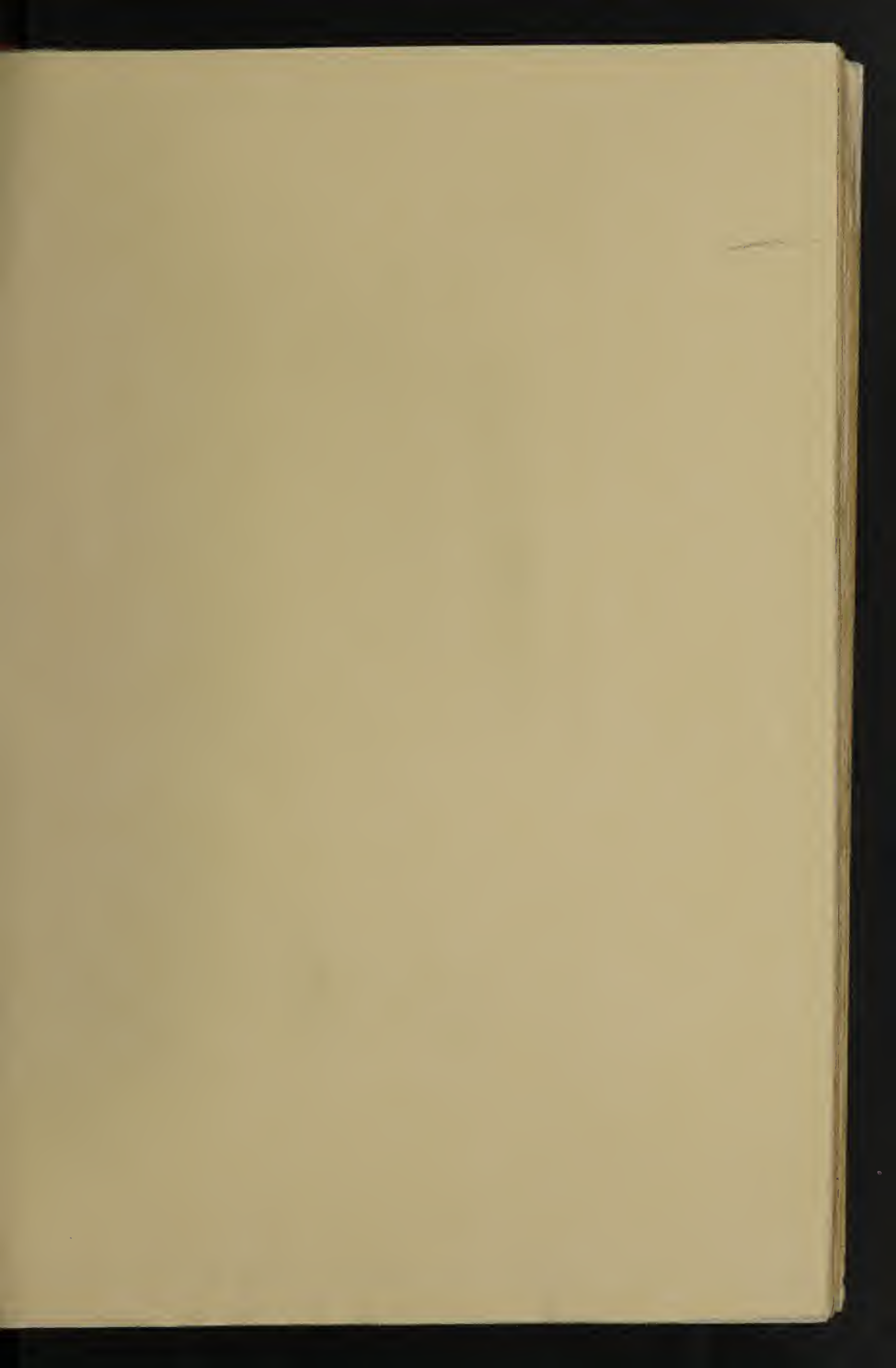


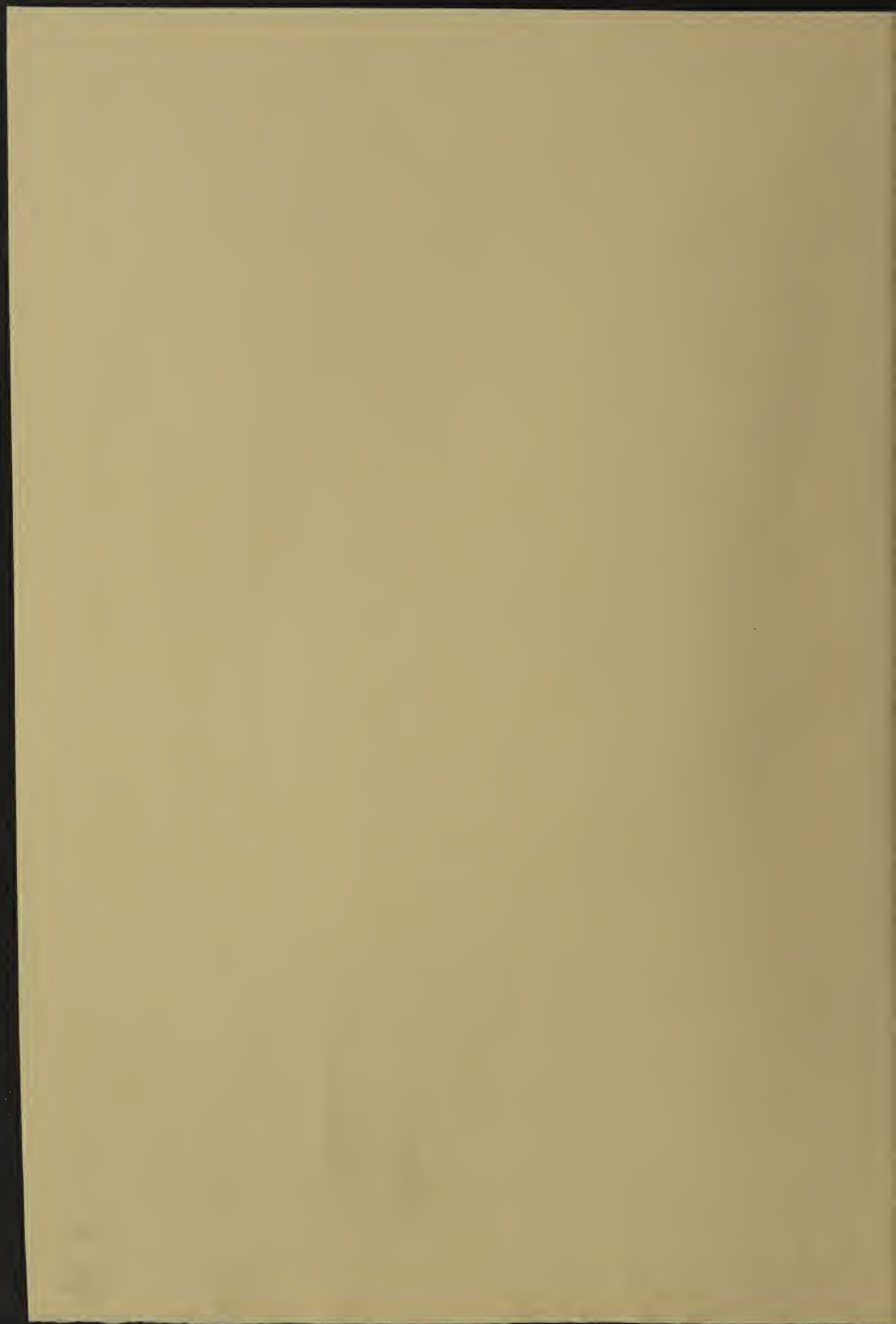
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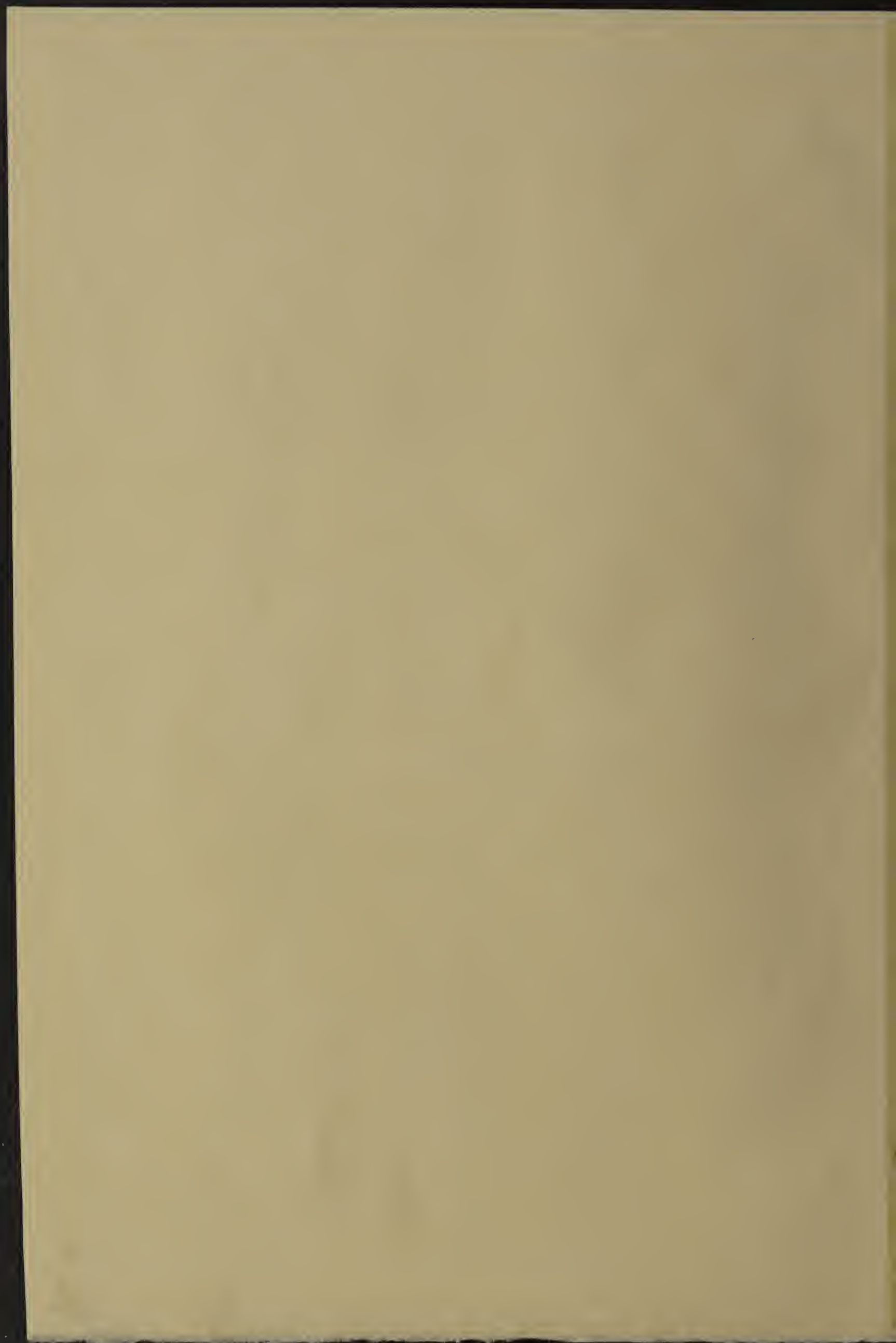
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(female genitalia)











SURE GUIDE;

The *BEST* and *NEAREST* Way

Phyſick and Chyrurgery:

The *Arts of Healing by Medicine*, and
MANUAL OPERATION.

An *Anatomical Description* of the whol Body of
Man, and its Parts, with their *Respective Disea-*
ses, demonſtrated from the *Fabrick* and *Uſe* of
the *ſaid Parts*. In Six Books.

V I Z.

- | | | | |
|---|---|----|--|
| 1 | Describing all, and every of the Bones of Mans Body, according to the Ancient Method. | 4 | Describing the Head, and Face, with all their Parts Containing and Contained, and their respective Diseases. |
| 2 | Describing the Belly, and all its Parts and Bowels, with their respective Diseases. | 5 | Describing the Limbs of the Body, with the many Regiments of Muscles, and their Diseases. |
| 3 | Describing the Chest, and all its Parts and Contents, with their respective Diseases. | 6. | Containing a new Description of the Bones, by a Method first invented by our Author, handling all the Diseases and Symptoms of the said Bones. |

At the End of the Six Books, are added twenty four Tables, cut in Brass, containing one hundred eighty four Figures, with an Explanation of them; which are referred to in above a thousand places in the Books, for the Help of yong Artists.

Written in Latine, by *Johannes Riolanus*, Junior; Doctor of Physick, Physitian in ordinary to the *Queen Mother of France* many years together, and the last she had: And also the *Kings* Professor of *Anatomy* and *Herbarism*, in the University of *Paris*.

Engliſhed by *J. G. G.* Gent. and *W. R.* Doctor
of the *Liberal Arts*, and of *Physick*.

London: Printed by Peter Cole, and are to be sold at his Shop, at the Sign of the
Printing-Press in Cornhil, near the Royal Exchange. 1657.

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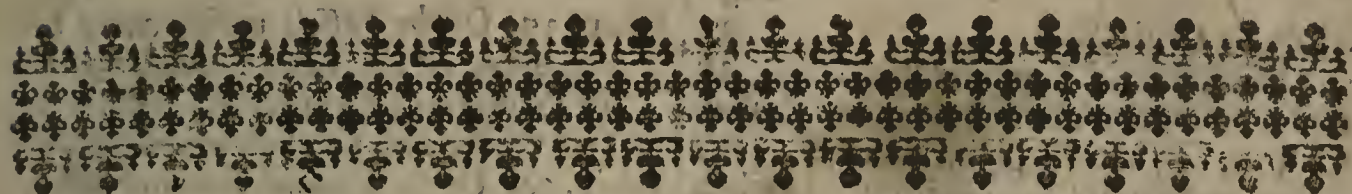
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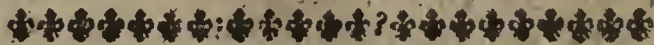
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

A New Osteologia, or History of the Bones.


Wherein he treats of the Bones, Ligaments, and Gristles of the whole Body,

by which the Frame of the Body is compacted together, the Muscles being removed; handling all the Diseases and Symptoms which happen unto the Bones. 260

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The Use of the Letters and Figures, directing to the twenty four Tables, or Brass Cuts; and the hundred eighty four Figures in those Tables, representing the Parts of the Body.

EVery Brass Cut, or Print, is called a Table; and the said Prints or Tables, are twenty four, and have their respective Numbers set at the Foot of the Table, or Print, on the corner that is outmost, and against the Readers right hand. Each particular Figure is also numbred, and the Number set over its Head, and the several parts of each Figure, are distinguished by Letters of the Alphabet, for the easier finding. To compare therefore, the Discourse with the Tables, I shall teach you by an Example or two. In Chap. 8. page 9. line 21. The word Coronalis, is marked with the Letter ^a; to which Letter, looking at the end of the said Chapter, you find ^a T. 15. f. 3. a a a.  intimating that you must turn to Table 15. Figure 3. and that part of the Figure which is marked a a a. which represents the Coronal Suture of the Skull: The Mark  shews that the former Citation is ended. Again, in the next line of page 9. by the word Lambdoides, you find Letter ^b, to which looking at the end of the said Chapter, you find ^b f. 4. b b.  to teach you that in the 15 Table foregoing, Figure 4. and on that part of the Figure marked b b. you shall find the Suture of the Skull called Lambdoides: and this mark  after b b. shews again that the Citation is ended. Again, in the same line, by the word Sagittalis, you find Letter ^c, to which turning at the end of the Chapter, you shall there find ^c f. 3. b b. f. 4. a a. intimating that in Figure 3. of the forenamed Table 15. and in that part of the Figure which is marked b b. Also in Figure 4. of the same Table, on that part which is marked a a you shall find the Sagittal Suture described. The mark  shews the Citation is ended.

Note that where you find not among the Directory Letters, T. for Table, that Figure belongs to the fore-mentioned Table. Also you are to take notice that between two Citations, you shall find this mark .

Finally: He that would make his most advantage by the use of this Book should, having been present at some Anatomical Dissections of the whole Body, study the Tables first, with their Explanations on the opposite Pages; and read the Discourse of Riolanus, and compare it all along with the Tables, which may be best done, if the Tables be bound up by themselves, so as to open alwaies while he is reading the respective Chapters, referring to the Table.

THE HISTORY OF THE
LIFE OF THE LATE
JAMES OGLETHORPE
BY
JAMES OGLETHORPE

THE HISTORY OF THE
LIFE OF THE LATE
JAMES OGLETHORPE
BY
JAMES OGLETHORPE



To the Right Honorable,
HENRY LAWRENCE, Esquire;
*Lord President of the Councel to his
Highness, the Lord Protector.*

Right Honorable,



HT being my hap some years since to find in the Stationers shop at Amsterdam, your Lordships Elegant Treatise of Baptisme, and being upon Enquiry, informed touching the quality of the Author; I wondred what Gentleman it was, that having a stock of Honor & Repute in the world, had with-
al- so much Christian Courage, as to venture it in that kind. For I judged (and I suppose rightly) that for a Gentleman of name and note, at that time to dare to vindicate the true Christian Baptisme, contemning the clamorous censures of the weake Multitude of Pretenders to Religion and Learning, was an Act of more true and high Courage than to storm a Town. And I humbly conceive, Experience has evidenced the Truth hereof, since hundreds (not to say thousands) that have adventured their Lives to gain Honor and Riches in the Field, have in their hearts found it too hard an Adventure (however otherwise convinc't in their understandings) to own and acknowledg the true Christian Baptisme, and subject themselves to the scorned practice thereof, with the evident hazard of much of their acquired Honor, and of their future Repute, and the advancement depending there upon.

That this action, nevertheless, of yours (my Lord) has not been attended, with al that Ignominy and Prejudice, which was only to be expected from Men; is the singular providence of God, giving Courage and Ingenuity, to many others of note, soon after (much animated doubtless by so noble and generous a Leader as your Lordship) to acknow-
ledg and submit to the Divine verity, and beautiful, and most

The Epistle Dedicatory.

lovely Rationality of that solemn Institution of our Mr. Christ; and his eminent blessing that part of the soldiery, Characterised thereby. Much affected therefore with your Lordships Christian Vertue in this kind, and desirous to commend the same to Posterity; It has not been since that time in my power to do it more effectually, than by prefixing your truly honorable Name in the Front of this excellent Anatomical Treatise, and best Foundation of the Art of Healing, commonly though corruptly called Physick. The fitness of which Dedication, I shal with your Honors gentle Patience, thus demonstrate.

Seeing this book is nothing (for the most part) but a Declaration and Exposition of the stupendiously admirable wisdom of the *Eternal our Maker*, shining forth in the most curious Fabrick of Mans body; to confirm and seal the beleefe of the Resurrection whereof (which is the very Foundation of Christianity) baptisme seems (by the Scripture) to have been chiefly ordained, by our great Mr. Christ; that as we had one solemn Ceremony to represent his sufferings and death, we might not want another to set forth and solemnize his burial and Resurrection (without which his own death and his Disciples Faith had been in vain) and to take possession in and by a Figure of our own Resurrection to come (For, *we are, saith Paul, Buried with Christ, in our Baptisme, and therein also risen with him*; That is, in a figure, being through a solemn Ceremonious possession of our future Resurrection from the grave, instated into eternal life.) This being so (my Lord) to whom should this excellent Description of the body of Man in general, with al its parts, and their Respective Diseases, be dedicated, rather than to him that has vindicated to the Christian world, that excellent pledge of the Resurrection thereof; to wit, the Baptisme of Christ rightly solemnized: whereby al true beleivers are mightily assured, that though this curiously built House of our Earthly Tabernacle, be sown in the dust, yet it shal not there abide for ever, as the beasts that perish. Accept therefore (Generous Sir) from your most humble servant, this Testimony of your Christian
Courage

1 Cor. 13.
15, 16 17.
18. 30. 31.
32.

Colo. 2. 12.

The Epistle Dedicatory.

Courage and sincerity, and suffer this excellent Treatise to shelter it self under your honorable Patronage. And though this testimony of your vertue so publicly given, may (I fear) afford some disgust to your Modesty, yet I beseech your Lordship to let it pass, for the glory of our great Mr. Christ, and the Edification of Christendom. And I have much reason to hope, it may be a Monument of your honorable Memory, when probably the royal and Magnificent tombes at Westminster, shal pledge the Fate of them in Pauls, and be overwhelmed with Dust and Ruins. Such is the desire and Hopes (my Lord) of him that craves leave to subscribe himself,

From my House neer
Cripple-Gate in London.
December, 22. 1656.

Your Honors,

*Most humble Servant, and true
Admirer of your Christian Inge-
nuity, Sincerity, and Courage,*

WILLIAM RAND.

Mris. Culpepers Information, Vindication, and Testimony, concerning her Husbands Books to be Published after his Death.

SO great are the Afflictions wherewith our Heavenly Father hath been pleased to exercise me his poor Hand-maid, that I have not only lived to see my dear Husband, (the Stay and Solace of my Life) taken from me: but it hath been my hard hap also to see his Reputation, and Memory (which wil be dear to al Posterity, for the Works he hath written for the Common Good of this Nation) blemished, and Eclipsed, by the covetous and unjust Forgeries of one, who, though he calls himself Nathaniel, is far from being an Israelite in whom there is no guile; who was not content to publish a Hodgpodg of undigested Collections, and Observations of my dear Husband deceased, under the Title of Culpeper's last Legacy; but to make the Deceit more taking, he stealed his Forehead so far, and brased it so hard, as not to be ashamed to forge two Epistles, one in mine, and the other in my Husbands Name; of the penning of which, he nor I, never so much as dreamed: And yet he impudently affirmeth in my Name, that my Husband Laid a severe Injunction on me to publish them for the general good, after his decease; and that they are his last Experiences in Physick and Chyrurgery. And in the Title of his Book, he said, They are the choycest, and most profitable secrets, resolved never to be published til after his Death. Al which Expressions in the Title and Epistles, are as fals as the Father of Lyes; and every word in them, forged and feigned. And he knew wel enough, that no discreet, honest man, that was a friend to my Husband, or me, would ever have agreed to such infamous and dishonest practices; and therefore I desire all Courteous Readers of the writings of my Husband, to take notice of this Deceit, and to assure themselves that it never entred into his head, to publish such an undigested Gallimoffery, under the promising and solemn Name of his Last Legacy, and that whereby he gained his Reputation in the World, as the Imposter makes him speak in his forged Epistle. And I desire any in different Reader, that hath observed my Husbands losty, and Masculine manner of expressing himself in his Prefaces, and Epistles Dedictory, whether in case he had been minded or disposed to take so solemn a farewell of the world, as the Forger makes him to do; whether,

I say, he would have done it in such a whining fashion, and so in the Stile of a Balade-maker, as to say, And now, if it please Heaven to put a period to my Life, and Studies, that I must bid al things under the Sun farewell: Farewel to my dear Wife and Child, farewell Arts and Sciences, farewell al worldly Glories, adiew Readers. Certainly my Husband would have been far more serious, and material, in such a case, as any discreet man wil Judg. Neither can it be thought, that in such a solemn Valediction, he could possibly forget his wonted respects to the Colledg of Doctors, to whom he did so frequently address himself, in divers of his writings.

Courteous Reader, I shal say no more touching the abuse of the Book-seller, only to prevent (as much as concerns me) thy being abused for the future, know, That my Husband left seventy-nine Books of his own making, or Translating, in my hand, and I have deposited them into the hands of his, and my much honored Friend, Mr. Peter Cole, Book-seller, at the Printing-Press, neer the Royal Exchange (for the good of my Child) from whom thou mayest expect to rective in print, such of them as shal be thought fit to serve thee in due season, without any Disguises or Forgeries, unto which I do hereby give my attestation. Also my Husband left seventeen Books compleatly perfected, in the hands of the said Mr. Cole, for which he paid my Husband in his life-time: And Mr. Cole is ready and willing (on any good occasion) to shew any of the said seventy-nine Books, or the seventeen, to such as doubt thereof.

And if any Person shal question the Truth of any part of this Vindication, or Epistle; if they wil take pains to come to me, I wil face to face, justify the truth of every word thereof, as I have subscribed my Hand thereunto in the presence of many witnesses.

I profess in the presence of the great God, the searcher of al hearts, before whom Mr. Brooks and I must one day give an account of al our Actions: That I have not published this Epistle or Vindication, out of any disrespect to Mr. Brooks (for I much respect the man, and would be glad to serve him to my power) but only to cleer my Husband from the folly and weaknes cast upon him by the means above expressed. And out of tendernes to Mr. Brooks, I first tried other means of keeping, and afterwards of repairing my Husbands Credit, and then stayed long to see if he would repair (in any measure) the wrong done to my Husband, and my self. I desire to be,

From my House, next door to the
Red Lyon in Spittle-fields,
October, 18. 1655.

Your Servant (in,
and for the Truth)

Alice Culpeper.

Mris. Culpeper did the 18. of October, subscribe this Epistle in Vindication of her Husband's Reputation, before Ten Witneffes, as she had done another Epistle on the ninth of October, almost in the same words with this, except neer the Conclusion.

THE
FIRST BOOK
OF
ANATOMY
AND
PHYSICK,
OF
John Riolanus.

Chap. I. *The Intent of the Author is declared.*



Natomy, is considered and handled two waies, *Philosophically*, and *Physically*, Galen, Lib. 1. *Anat.* The *Philosopher* searcheth out the structure of the Parts, their action, and use, that he may know himself, & that the * *Work-master* may be admired in his work; and therefore the knowledge of the Parts alone does content him. But the *Physitian*, besides the knowledge of this, brings al into a *Practical* way, and searcheth after the *Natural* dispositions of every Part, that so by veiwing the *Anatomy* of the Car-

The Consideration of Anatomy is.

Philosophical.

(* Viz. God)

Physical.

kases of sound and sick men; he may more easily know the accidents against Nature; which happen to those Parts, in such as are alive.

By Dispositions against Nature, is to be understood Diseases, whose generation and end, whether it wil be good or bad, the way and manner of Curing, he that would know exactly, must be skilled both in *Philosophical*, and *Physical* Anatomy; and I dare boldly affirm, that he wil be an abler, and more skilful *Physitian* that is wel skilled in this *Anatomy*, than he that contents himself, with the bare knowledge of the Parts.

Both which are necessary.

This manner of shewing, and teaching Anatomy is new, but gives great light, & is wonderful necessary for a *Physitian*, and I wil lay it down intermixed with the order of Anatomy in al the Parts, and shew particularly in every Part, what profit wil thereby redound unto a *Physitian*, in his Practice. And seeing

seeing the Natural Constitution of every Part which Hippocrates calls *Euphuian*, and is commonly called *Health*, is three-fold, *Similar, Organical, and common*. The Preternatural Constitution of the Parts, called *Sickness*, must likewise be three-fold and make three kinds of Diseases, *Viz. A Disease of the Similar, a Disease of the Organical Parts, and a Disease common to both.* The *Similar Constitution*, according to Nature, consists in *Substance, and Temper*; The *Organical Constitution*, which pertains to the construction of the Organ, is placed, in *number, Magnitude, Scituation, and shape or Conformation*; which Conformation is again divided into *Figure, Passage, Cavity, Roughness, and smoothness*; The *common Constitution of Similar, and Organical Parts*, consists in *Union and Connexion*. This three-fold Natural Constitution, I will declare in all the Parts; afterwards I will lay down in a few words, what may be gathered from this Sound Constitution, for the Knowledge, fore knowledge, and Cure of a Diseased Constitution; And *Anatomy* handled in this Method, will be the beginning, Middle, and end of the whole Art of Physick. This is a short, easie, and clear Method, Quickly, and rightly to learn the Art of Curing; which propounds the same, visible to the Eyes of such as are well versed in my Fathers writings, or in the *Institutions of Sennertus*. for by this Method, I shall unlock, & display the treasures in *Anatomy of Physick*. But perhaps some Fool, that is unskilled, will reprove our *Disigne, & Object*, that we confound the whole Art of Medicine, being *Anatomy* is a Part of *Physiology*, distinct from the rest; and therefore ought to be taught apart, seeing *Galen* himself, in the beginning of his dissection of *Muscles*, reproves the Anatomical Book of *Lycus*; because in his Treatise of *Muscles* he inserted the Diseases of the Parts. If any prattle such things against us, they will quickly hold their peace, if they read *Gal. Lib. 2. admin. Anatom.* Relating, That Antient Physicians regarded *Anatomy* so much, that in all their Books of the Cure of Diseases, they inserted *Anatomy*; and this we see *Hippocrates* did in all his Books. Many are the Sorts of the Figures, both within, and without the Body, (saith *Hippocrates*, in *Lib. de vet. Med.*) Which have much different qualifications in the Sick, and the Sound; all which you must perfectly distinguish one from another, that you may rightly know, and observe the causes of every one of them.

And Profitable
in Medicine.

According to *Aristotle*, *Health, and Sickness*, are the Fundamental Parts of Medicine: Both of them are contained in the Parts; and *Sickness* compared with *Health* is the better discerned. Ad to this, That *Aristotle* Writes, that he that would Cure the Eyes, must first know the Structure of the Eye. Again, *Hippocrates* held, that Diseases were distinguished according to the Parts they were inherent in; and the principal Curative indications, were taken from the Affect, and the Part affected; and Remedies both Medicinal, and Chyrurgical were Prescribed and administered diversly, according to the Parts Afflicted. Therefore *Galen* wrote his *Therapeutics* of the composition of Medicines, according to the Parts afflicted: and *Avicenna* did wisely, when perceiving that the Seats of Diseases could not be known without skill in *Anatomy*, Before the Diseases of the particular Parts he set down their *Anatomy*. And if we believe *Galen* in *Lib. de Part med.* The first Matter or Subject of Medicine, is the Body, as it is the Subject of *Health and Sickness*.

The Intent of
the Author.

Our intent then is by a short and easie Method, To deliver in writing, and demonstrate in dead Bodies, of the seats of all Diseases, and Symptoms, both Internal, and External; and the particular way of Cure according to the order of *Anatomy*, which is publickly observed. A notable peice of Workmanship to learn Physick by, by which 'tis easie to manifest, and bring to light the Errours, in the Cures of Diseases and to instruct and inform such as are Studious in Physick, by that time they have been hearers and beholders two yeares, of two Anatomies in a year, with diligent reading of Books,

Books, and excercise of the knowing of Plants, and other Drugs, and visiting of the Sick with him that is their teacher. Excellently said *Johannes Fernellius* in the beginning of his Pathology, *I shal never think any man wel skilled in the knowledg of Diseases, unless he have been an Eye witness of the seats of them, in the Body of man, and know how they are affected against Nature; neither can he come to this unless he be skilful and exquisite in Anatomy, and whatsoever he reads or hears, let him seriously contemplate it in the Body of man, and settle the cheif knowledg of things in his mind.*

Chap. 2. *Why we begin our Anatomy with the Treatise of Bones.*

That kind of stile is two-fold, which is used in the explication of any thing, *Gal. Com. ad Part. q. Lib. 1. de fract. et Cap. 1. Lib. Synops. de Puls.* The first is called *Synopticus*, when the Matter is briefly laid down; The other *Diexodicus*, when it is Copiously unfolded, nothing being passed by which is profitable to be declared: The former helps the memory; the latter cleers the matter to the understanding. For which Cause *Galen* divided his Books into *Isagogical*, and perfect; the first being fitted to young beginners, the other to proficients, as himself testifies. *Lib. de libris Propriis.* This is also confirmed by the authority of *Hippocrates*; *Lib. de vet. Med.* Where he adviseth Physicians to teach easie things to young students, and such as may be quickly learned; ad hereunto; That al men desire to learn apace, according to *Aristor. Lib. 2. de Rhetor. Chap. 10.* And the Method of breife teaching, is alwaies grateful, both to young students, and to perfect Masters; for it teacheth the former what things must be learned; and in the latter calls back to their memory what they have learned before, and almost forgotten, *Gal. Lib. 4. de diff. puls.*

The Method of teaching double.

Wisely, and Elegantly, did the Emperor *Justinian* judg, That a compendium of the Lawes was first to be propounded, to invite Novices to knowledg. Then are al things delivered most commodiously when they are first delivered by a plain and simple way, and then by an exact and diligent interpretation; for if we burden weak, though studious minds at beginning, with variety and Multiplicity of things, we either make them desert their studies, or else put young Men to great labor and distrust, and bring them by a longer way to what might be learned with more speed, less labor, and no distrust.

Therefore following the precepts of *Galen*, and *Hippocrates*, I wil describe a breife, and cleer Manual of Anatomy, following the counsel of *Galen*, who had rather write a *Synopsis* of his Books of Pulses himself, then to leave the business to another, who by not understanding his mind, and sense, should pervert or confound his meaning.

why the Author wrote a Synopsis.

I begin with the Bones, because they are the foundation of al the Parts of the whol Body, which is substaigned, Included, Preserved, and moved by the Bones; which, according to *Hippocrates*, give stability, and form to the Body.

why he begins with the Bones.

Therefore he that is studious in Physick, ought to be instructed in the perfect knowledg of the Bones, before he come to behold the Anatomy of the whole Body: otherwise he wil be ignorant in designing the original, and infection of the Muscles, and the sticking of other Parts to certain Conceptacles of the Bones, unless he be skilled in the History of Bones; at which Anatomy is to begin, as *Hippocrates* taught, and after him, *Galen*.

The necessity of writing of the Bones.

Chap. 3. *The Division of Osteology, or the History of the Bones.*

The Parts of
Osteology.

THE History of the Bones is called. *Osteology*, of which are two Parts: *Practice*, and *Theory*. I call that the *Theory*, which is conversant in the knowledge of their conformation and use. The *Practice* is the manual operation which comprehends both *Ossilegium*, and *Ossifragium*; *Ossilegium*, is the manner of preparing Bones to make a *Skeleton*; *Ossifragium* is that which searches out the joining, and knitting together of the Bones, and Joynts, by Ligaments, and Cartilages, and by breaking, and deviding them; searches out their internal, and hidden Parts.

See Chap. 26. and 27. Lib. 6. Of this Book.

Chap. 4. *Of the Composition, and Definition of a Bone.*

Four Con-
siderations.

THAT the Nature of a Bone may be perfectly understood, there are four things to be considered in it: The Matter, Efficient, Form, and End.

1.
Matter, Pro-
per.

The Matter of the Bone is Proper, or Diverse.

Proper is considered Generally, or Specially.

Generation.

Proper Matter, taken Generally, is double; the one for Generation, the other for Nourishment; the Bones are made of the Seed by consent of all Physicians. The Seed consists of Humor, and Spirit: The Humors are of two Parts; the one thinner, of which the noble Parts are formed; the other thicker, of which the Bones are ingendred.

Nourishment.

The matter of Nourishment is also two fold; Remote, and Neer: Remote, is Blood, by which all the Parts of our Body are nourished: Neer, is the Marrow contained in the Cavity of the Bones, or a Marrowy Juyce shut up in the Spongius Bones.

Constitution.

The Proper Matter considered specially, regards the Bone already made, which is various in respect of substance, and quallity; and so the substance of one Bone is diverse, by reason of the *Epiphysis*, which is Softer then the rest of the Bone; or the *Apophysis*, which is harder then the rest of the Bone: also the whole Bone, if it be Sollid, is harder without, then it is within. If it be hollow, the Internal Superficies is hardest.

As for what belongs to Quallity, and Namely Color; the Bone, the more Sollid it is, the more White it is; that which is hollow, is pale or red-dish.

Matter di-
verse.

By the diverse Matter of the Bone, understand that which compasseth it about; and it is a Membrane, and a Cartilage. The Membrane which compasseth about the Bone, is called *Periostion*, and sticks firmly to it. By benefit of which, it Obscurely feels. The extremities of the Bones are covered with a Cartilage, which Facilitates the Motion of the Bone, and hinders its wearing.

2.
Efficient cause.

The Efficient Cause of the Bone, is the Implanted Generative Spirit, or rather heat, which torrefies and dryes the Matter of the Bone. *Gal Lib. 1. de facul. natural.* acknowledgeth the faculty which forms the Bones; to which Heat and Spirit, do administer.

3.
Form,
Essential.

The form of a Bone is double; Essential, and accidental: That is called Essential, which makes it to be a Bone, Namely, the Vegetable Soul.

The

The Face, saith *Aristotle Lib. 2. de Generat. animal*, is no Face, if it want the Soul; and so is the Flesh and Bone. But with Physicians, the form of Similar Parts, is nothing else then their temper. The temper of the Bone, is cold and dry; therefore Coldness and Driness constitute the form of the Bone. The accidental form, is the Figure of them, which is Proper, and peculiar to every Bone, and is most commonly round in al Bones, both in Longitude, and Latitude.

Accidental.

The end of the Bones, is their Use; and this is general, and particular; That is called General, which serves for the whol Body; and that is three fold, 1. To establish, and make firm the soft Parts. 2. To give shape, and Figure to the Parts. 3. To help the Motion, and Progress of the Body. The Particular end, or use, is that which is Proper to every severall Bone.

4.
End.
General.
Special.

From what hath been written, this Definition of a Bone, may be gathered; *It is a Similar Part, most cold and dry, Formed by heat of the thick and Fat substance of the Seed; for the form and settlement of the whole Body.*

Definition.

Chap. 5. *Of the Qualities, or Natural Disposition of the Bones.*

THe Doctrine of Bones, ought to be double; one which treats of the Bones of infants, which from their Birth til seven years of Age, differ in many things from such as are grown up: the other of men of perfect Age, which we now handle.

Doctrine of
Bones Double,
Of Infants
and men grown
up.

And seeing al Doctrin of Bones, is referred to Physical use, we must know the Conditions, and affections of Bones, wel and Naturally affected, which are either common to al, or Proper to some.

The common are nine which shal be Described, and Demonstrated, in our new *Osteology*, at the latter end of this Manual. In dry Bones wel Prepared, are five things shewed. 1. Hardness and solidity. 2. They have holes outwardly, Especially toward the Extremities, by which is ingress given to the little Veines, and arteries, for Nourishment and life. 3. A cartilaginous Crust at the Extremities, and the *Periostion*, which compasseth about the whol Bone, the Cartilaginous extremities excepted. 4. Continuity, and Equality in its whol substance; wherefore the callous, by which broken Bones are united, is not Natural. 5. A fit and convenient joyning of one Bone with another.

Affection of
the Bones are
Common.

The affections Proper to the severall Bones, are twofold; either such as regard every Bone severally; or such as regard more Bones then one, joyned together.

Proper,

1. The affections of the first sort, are four; Hollowness, Prominence, Roughness, and Smoothness; which affections are considered in the extreme superficies of the Bone, in as much as Bones are referred to mutual conjunction because they cannot subsist alone by themselves. The Head of the *a Omoplata* is hollow; the *b Shoulder Bone* sticks out; the *c Ischium*, or Huckle-bone, is hollow; the *d Bone of the Thigh* sticks out; the Skull is rough behind for the *e* insertion of Muscles, in other places 'tis smooth, and Polished: Al which affections, if they are such as Nature made them, they are according to Nature; if otherwise, they are beside Nature.

2.
of
Bones separated.

Also a Cavity is deep, or superficial; that which is deep, is called *f Cotyle*; the superficial *g Glene*. A Prominency, or Parts sticking out, is called *Apophysis*, or *Epiphysis*: Both of them are round, or long, or hollow: If it be round, it is called a Head; if it be large and long, it is absolutely Named a *h Head*; but if it be short, and depressed, it is called *i Condylus*. The Heads or *Condyls* of smal Bones, are not *Epiphysis*, but *Apiphysis*; as in the nether Jaw, and in the Ribs, and the Bones of the Fingers, and Toes.

A long

A long *Apophysis*, is either with a poynt, and called *Corone*; or simply long, and that according to the Figure of it, hath diverse Names; or^k *Styloides* ^l*Coracoides*, ^m*Odontoides*; or else tis terminated in a Head, and then is calledⁿ *Cervix* or a Neck.

Whether Apo-
phyfes have
hollownesſes.

It is not absurd, that some *Apophysis* should be hollow, Seeing al Cavities are, as it were, ingraved in the *Apophysis*; or elle are made of two or three *Apophyses*, as in the Cavity of the *Ischium*, or Huckle-bone: and although sometimes a Cavity make the Body of the Bone, yet it is formed by a bony Circumference; which Seeing it sticks out obliquely, and orbicularly, without the plain superficies, it is worthily accounted an *Apophysis*; *Gal. Lib. de Offibus*. acknowledgeth the *Omoplata* to be an *Apophysis*, which is a *Cervix*, the extremity of which, ends in the *Glene*; therefore Cavities ought to be referred to *Apophysis*; and a Cavity if it be round and large, may be called a Head, for the Neck is alwaies subjected to the Head *Gal. Proem. Lib. de Offib.*

The Body

and

Extremities,
which are
Apophyses,
and
Epiphyſis.

In every Bone, which being joyned to another makes a Joynt, I observe the Body and the extremities, which are *Adnata*, or *Enata*; The body is the principal Part, formed of Nature, that it may be the foundation of the extream Parts; for Nature ever-more begins the formation of the Bones in the middle, and produceth them towards the extremities. The extremities of the bones called *Enata*, are *p* *Apophyses*; *Adnata* are *q* *Epiphyſes*: the Treatise of the *Epiphyſes* pertains to the Osteology of Infants, therefore we wil not speak of it here.

Yet this you may know, that *Epiphyſes* belong to the extremity of the Joynts of the bones; and that their Nature is to be sought out in Children; for in men grown up, they degenerate into *Apophyses*, no Foot-steps of the ancient Division remaining; and yet inwardly they keep the condition of their Proper Nature, which ought to be like a pumice, and bloody; but the *Apophyses* are alwaies harder.

2.
The Joynting
of Bones.

The second sort of Affections are, the Articulations of bones, one with another, which in diverse bones, are different; which now we come to speak of, in General.

a, T. 21. f. 2. C. ^b, f. 1. a. ^c, f. 4. B. ^d, f. 1. D. ^e, T. 15. f. 4. C. ^f, T. 21. f. 4. B. ^g, f. 4. F. f. 2. Fc. ^h, f. 1. dd. f. 4. a. ⁱ, f. 2. II. ^k, T. 15. f. b. D. ^l, T. 21. f. 2. d. ^m, T. 13. f. 21. a. ⁿ, T. 21. f. 2. c. ^o, *ibid* ^p, T. 2. f. 1. aa. f. 2. bcd. T. 15. f. 3. MNd. ^q, T. 21. f. 1. 2. q. T. 13. f. 21. a. T. 15. f. 6. D.

Chap. 6. Of the Conjunction of Bones.

Why there are
many Bones in
man.

Seeing it is not safe, nor comly for man, that Divine Creature, to creep along like Worms, and Serpents; Nature hath set his body bolt upright, with firm, and solid bones; not only three, or four in number, but very many various, and distinct, whereby he may bow, and move himself every way; And that this Workmanship might be the more Elegant, the Bones are so Joyned together, that the extremity of one, enters into the Cavity of the other.

This structure is called a Joynt, the Nature of which, is much controverted amongst Anatomists; some contending that the touching of two bones one with another, makes a Joynt; others, besides touching, ad motion. So, that it is the movable touching of two bones, which makes a Joynt.

If Motion be removed from the Definition of a Joynt, *Galens* Doctrine may easily be defended. He constitutes two kinds of Articulation; *Diarthrosis*, with

with manifest Motion; *Synarthrosis*, with Obscure, or no Motion: and he assigns the differences of *Synarthrosis*, which are altogether immovable, to be *Sutura*, *Harmonia*, and *Gomphosis*; with those which take away Motion in the Definition of Articulation, refer to the third species of Articulation, which they call Neutral, or mean, between *Diarthrosis* and *Synarthrosis*. Some give it a new Name, *Amphiarthrosis*, to wit, when the structure is to Obscure, and the Motion so hidden, that you know not whether it appertain to *Diarthrosis*, or *Synarthrosis*. But that place of *Galen* being ill understood, deceives many Anatomists. This Doctrine of *Galen* seems more probable, thus.

The bones are knit together by *Articulations*, and *Symphyses*: *Articulation*, is the knittings, or touching of two bones; the differences of which are *Diarthrosis*, and *Synarthrosis*; the one hath evident Motion, the other Obscure, or none at all; and therefore the differences of each, are equal: but the one, for example sake, is called *Enarthrosis Diarthrodes*, with a manifest Motion; the other *Enarthrosis Synarthrodes*, with an Obscure Motion; Judge the like of the other differences.

Enarthrosis, is, when a large, and long Head, goes into a deep Cavity; which seeing it is common both to *Diarthrosis*, and *Synarthrosis*, we will give an example of them Both. The Motion of *Enarthrosis Diarthrodes*, is manifest in the Joynt of the *Iscium*: the Motion of *Enarthrosis Synarthrodes*, is Obscure in the Articulation of the Ankle with the *Scaphois*.

When a depressed, and plain Head, is received by a shallow and superficial Cavity, this Joynting is called *Arthrodia*. an exemple of *Arthrodia Diarthrodes*, is in the conjunction of the Shoulder with the *Omo-plata*. An example of *Arthrodia Synarthrodes*, is in the Bones of the Wrist, with the *Metacarpus*.

Ginglymos, is a mutual ingress of the bones, such as you shal usually see in the hinges of Doors and Windows; in which that Part of the Hinge which bears and that which circles about, have a Mutual ingress one into another. The Motion of *Ginglymus Diarthrodes*, is manifest in the Elbow; the Motion of *Ginglymus Synarthrodes*, is Obscure in the joyning of the Ankle to the Heel. Modern writers add a fourth to those three, which they call *Trochis*, in which the Motion of conversion is apparent: such is the joyning of the first *Vertebra* with the second, but it is to be referred to *Arthrodia*; As for what belongs to *Ginglymus*, and its various differences, we will thus Methodically handle them: *Ginglymus* is an Articulation of bones, by mutual reception; and is simple, or compound: that is called simple, which is made of two bones, by one only and simple Articulation in the same Part, as in the juncture off the Elbow and Arm. Compound *Ginglymus* consists of a double Articulation, which is performed either in the same extremities, or in places distant, of two or three Bones, which by a double Articulation end in the same extremities. It is seen in the *Vertebrae* of the Neck. A compound *Ginglymos* by a double Articulation in places distant is seen in the *Cubitus* and *Radius*, in distant places of three bones is seen in all the *Vertebrae* of the Back and Loynes.

Besides *Synarthrosis*, contains under it, *Harmonia*, *Sutura*, and *Gomphosis*, which are without Motion. ^a *Harmonia*, is a Conjunction of bones, by simple touching without mutual ingress; and is distinguished by a Line, either right, or oblique, or manyfold. ^b *Sutura*, is the joyning of bones: as though the Teeth of two Jawes, or two Combs were thrust one within the other, and is altogether of one and the same form. *Gomphosis*, is when one bone sticks fast, and immovably in another, like a Naile in a Post.

Opposite to *Articulation*; is *Symphysis*, which is an immovable conjunction of bones, as though they were united, which Nature brings forth at first divided,

Conjunction
of Bones is

either by

Articulation
the Differences
of which are
Diarthrosis &
Synarthrosis.

The common
species of
which are.

1.
Enarthrosis.

2.
Arthrodia.

3.
Ginglymus.

which is

Simple
or
Compound.

Proper species
of *Synarthrosis*.

1.
Harmonia.

3.
Gomphosis.
Or by Sym-

physis whose
differences are
three.

divided, yet afterward in process of time, they grow together. Some are united without any discernable Medium, others with a Medium interposed. And therefore, the simple differences of *Symphysis* are three; *Syffarcosis*, *Syneurosis*, *Synchondrosis*. A mixed or compound *Symphysis*; is only one, viz. By a Nerve and Cartilage, which *Galen* calls *Neurochondrosis*.^d Of these you may see more in. *Com. at Gal. Lib. de Ossibus*.

*Galen's Doctr-
ine of Joynts.*

According to *Galen*, I thus expound the Doctrine of Joynts, Methodically. The Conjunction of all Joynts is made by the touching of their extremities: This touching is either *Articulus* or *Symphysis*: *Articulus* is a Natural joyning of Bones; which are divided amongst themselves, to the same use, for which they were formed; this use is either for Motion, or perspiration, or passage of some substance, or distinguishing of parts, or to secure them from hurting, as appears by the Articulations, *Harmonia*, *Sutura*, and *Gomphosis*. *Symphysis* is a Natural Union of bones which were at first divided, which grow together either with, or without an apparent Medium, because it is Obliterated, as in the *Sternum*, *Os-sacrum*, or *Ischium*, and the bony portions of the inferiour Jaw: and therefore the Conjunction of bones is divided into *Articulus*, and *Symphysis*, as it were into two species. Otherwise if *Symphysis*, be taken according to the mind of Modern Anatomists, and not according to the mind of *Galen*, wheresoever Articulation is, there must *Symphysis* needs be; for the Collection of bones, and *Galen* had ridiculously opposed *Symphysis*, to *Articulation*.

^a, T. 15. f. 3. R. &c. ^b, f. 4. a. b. ^c, f. b. m. n. o. ^d, See ch. 5. Lib. 6. of this Book.

Chap. 7. The Division of a Sceleton.

THE whole Fabrick of the bones sticking together, is by *Galen*, called **T SCELETOS**, It is vulgarly divided into the Head, the trunk and the limbs. *Hippocrates*, in his Book of the Nature of bones, constitutes six parts of the Sceleton; The Head, Neck, Breast, Back-bone, Hands, and Feet. *Galen*, into five, the Head, Back-bone, Breast, Hands, and Feet, as may easily be gathered from the series of his discourse. We follow the common division, and according to the example of *Galen*, begin at the Head, which is the first bone formed by Nature; and as it were the foundation of all the rest: which are framed in respect of largeness, according to the proportion of the Head.

Chap. 8. Of the Head, being the first Part of the Sceleton.

what the
Head is.

THE Head is defined by *Galen*, to be that whole substance which is above the Neck, and the dwelling place of the Brain.

It's Division.

It is divided into the Skul, and the Face, which latter comprehends both the Jaws.

what the Skul
is.

The Skul, is a globous, and round body; hollow within, but this roundness is not exactly, spœhircal, by Reason of those Eminencies, which stick out before, and behind, which make the Skul somewhat longish, and compressed on

Its Natural
figure.

the sides towards the Temples. If the Skul be not somewhat longish, it is depraved and this depravation is four-fold. 1. When it sticks not out before, 2. When it sticks not out behind. 3. When both Prominencies, are depraved, and then it is exactly round, 4. When its Longitude is turned into Latitude, which is inconsistent with life, because the Structure of the Brain, is perverted. Not

Not only one Bone, but many make the structure of the Skul, the number of which is various in Authors, *Galen* Attributes seven thereto, and *Sylvius* follows him: others hold 14. As *Baubin*, by adding the six bones, of each eare, which are Parts of the rocky bone, and included in the Cavities of the Eare, and add nothing at al to make the globe of the Scul. But more rightly *Paracelsus* adds fourteen bones to the Skul, but distinguisheth them, into containing, and contained, the containing are eight, the contained are the six smal bones, of the Eares. *Hippocrates*, Lib. de Off. Constitutes the Skul of eight bones, and yet he seems to comprehend some bones of the Face, this number the most excellent Anatomists follow; as *Vesalius*, *Columbus*, *Fallop*, from whom we wil not dissent, because this number our Eyes can witness, in Dissections.

The intervails, or connections of those bones, are called *Sutura*, which knit and unite the Bones together.

Of *Sutura's*, some are Proper, others common: They are Proper, which distinguish the bones of the Skul one from another: they are common, which distinguish the bones of the Skul from those of the uper Jaw. The Proper are divided into true, and false: the true, are the Saw-like Conjunctions of the bones intertexted, like the Teeth of a Comb. They are held by Anatomists, to be in number three. 1. *a Coronalis* is on the forepart of the Skul, which passeth transversly from one temple to the other. 2. opposite to this is, *b Lambdoides*, placed in the hinder part of the Head. 3. *c Sagittalis* knits both these together, passing from the top of the *Lambdoides*, by the longitude of the Skul, and sometimes comes even to the top of the Nose. The concurrence of the sagittal and coronal suture, the Greeks call *Bregma*; commonly 'tis called *Fontanella*, to which we apply causticks. Above the Ears, are two Sutures not like others, and therefore they are called false, or Bastard; they are called *d Squamosa*, from their scaly likenes, and joyn the bones of the Temples, to the bones of the top of the Head. Modern Anatomists hold the common sutures to be three: The first is called *e Frontalis*, beginning at the outward Angle of the Eye, and passing by the middle of the *Orbita*, even to the Eye-brow, and keeps the same way by the other Eye. The second is called *f Sphenoides*, which Circumcribes the *Os-sphenois*, beginning at the hinder part of the Head, and ending at the furthest Tooth of the upper Jaw. The third is called *g Ethmoidea*, and compasseth about the *Os Ethmois*, on every side; it seems rather to be Proper than Common, and belongs rather to *Harmonia* than *Sutura*.

The Sutures being wel known, 'tis an easie matter to distinguish the bones of the Skul; which are eight in number, and sometimes nine when the Sagittal Suture passeth to the Nostrels, and passeth through the middle of the Frontal bone; which is often seen in the Skulls of such as are grown up: al of them are Proper, none common, unless the *Sphenois*, according to *Galen*.

1. The bone of the *h Forehead* distinguished by the first, Common, and coronal Suture, which sometime is Cut into two part sby the Sagittal Suture is that Eminent seat of the Eye-brows; it includes two Cavities derived into the Nostrels.

The Second and third are called the bones of the i fore part of the Head, and are seperated from one another by the sagittal Suture; below, by the Scaly Suture; before by the coronal: behind by the *Lambdoides*.

Under these are the bones of the *k Temples*, which on the uper part are articulated like a Scale, but the inferior Part is hard, and rough, and called rocky; therefore it is commonly divided into the Scaly, and Rocky Parts.

In the Rocky part are four *Apophyses*; *l Mastoides* *m Styloides* and *n Lygomatica*; and the fourth is placed in the basis of the Skul, and may be called *o Auricularis*; in little Children it is an *Epiphysis*, and may easily be pulled off from the Rocky Bones.

The number of the Bones of the Skul.

Sutura what.

How many fold.

Proper are.

Three true ones.

1. *Coronalis.*

2. *Lambdoides.*

3. *Sagittalis.*

Two false ones.

Common are three.

1. *Frontalis.*

2. *Sphenoides.*

3. *Ethmoidea.*

The Eight Bones of the Skul.

Os Frontis.

Os Sincipitis.

The Bones of the Temple.

Its Apophyses.

- The Cavities of the Eare.* In this last *Apophysis*, are the three Cavities of the Eare contained: The first is external, and called the *P* Passage of hearing, The second is called *Concha*, and contains the internal Aire, and the three smal bones called *Malleolus Incus* and *Stapes*, as also a hole passing into the Cavity of the *Mastoid*. The extremity of this Cavity is directly opposite to the *Timpanum* and hath two small holes; of which the greater is called the *o* oval window and is the ingress into the third Cavity, which is called the *L* Labirinth, by reason of its various Circulations and turnings; the other hole is narrower, and is the Passage to the fourth *C* Cavity which is called *Cochlea*, from its rough and wreathed Figure.
- Concha.*
- 3. Labyrinthus.*
- 4. Cochlea.*
- Os Occipitale.* The sixt bone of the Skul is called *Λ* *Lambdoides* and *Occipitale*, and is compassed about with the Suture *Lambdois*, the Extremities of which, are called Horns by the Antients; but by *Galen*, Aditions to the *Lambdois*. To these are Causticks somtimes applyed.
- 15. Sphenoides.* The seventh Bone is *Σ* *Sphenoides*; in which we must consider the external, and internal table: In the internal table, are three *Apophyses*, which are called *κ* *Clinoides*; between these is a Cavity interjected, which is *β* called *Sella Sphenoidis*. The external Table hath four *Apophyses*; of which, two resembling the hollownes of a ship, are called *ν* *Naviculares*, by *Galen* they are called *Pterigoides*: the other pass under the *Zygomata*, to the Temples, and are called *Temporalls*. Between the two Tables, or Plates, is an empty *δ* Cavity passable to the Nose by a double hole, and severed within by a Bridg in the midst; this is alwaies wanting when the bone of the Forehead is solid.
- Os Ethmoides.* The eight bone is called *Ethmoides*, or according to *Galen* *Spongides*; it consists of seven different portions, The first is pierced thorough like a *σ* Sieve: from which, within the Skul, ariseth an *Apophysis*, which is the second portion of the bone, and is like a *ρ* Cocks Comb; without the Nostrells, from the same Sieve-like Table, depends that bony substance, which makes the *σ* Bridg between the Nostrells; and this is accounted the third portion of the bone: To this Bridg of the Nose, stick two Spongy bones, which make the fourth; and
- Tabula cribrosa.*
- Crista galli.*
- Septum Nasi.*
- Two Spongy Bones.* the fifth part of the *Ethmoides*: The sixt, and seventh portions of the *Ethmoides*, are thin Scales, plain, and smooth, as broad as a mans Thumb; which make the internal side of each *Orbita*, beside the great *Canthus*, and underneath they cover three, and somtimes four cells, disposed from the great *Canthus*, even to the lower-most *Orbita*.
- In the basis of the Skul, both internally and externally, certain Cavities are observed; of which some are called *Sinus*, others holes, others *Fossa* or pits; of which, see *Sylvius*, who was the first that handled them Methodically: we give them here Names according to their places, and Natures.
- Eight Sinus.* The *Sinus* are eight; two *Maxillares* in the uper Jaw, as many *Frontals* in the bone of the Forehead, so many *Sphenoides* in the bone *Sphenoidis*, and no fewer *Mastoides* in the *Apophyses* of the *Mastoid*.
- Holes internal.* Holes are internal, or external; Internal are twenty five commonly, somtimes twenty seven; twelve or thirteen on each side, and one without a fellow; which gives Egress to the Marrow of the Back. The first, is *β* *Ethmoides*; the second, *ι* *Sphenoides*; the third, *κ* *Opticus*; the fourth, *ι* *Scissura Orbitalis*; the fift, *μ* *Temporal*, from the nerve of the third conjugation which passeth to the temporal muscle; the sixt, *ν* *Gustativus*; the seventh, *Gustativus Secundus*; the eight, *ο* *Cervical*; the ninth, *Caroticus*; the tenth, *ρ* *Ariditorium*; the Eleventh, *σ* *Jugulare*; the twelfth, *τ* *Motivum Linguae*, or *Linguosum*; the thirteenth, and last, *ς* *Impar*, or *Occipitale*. The external holes are ten on each side, according to *Silvius*; to which I ad an eleventh, to wit, the external hole of the Eare; besides, at the Root of the *Stiloid*, in the extremity of the auricular *Apophysis*, on the external part, is a hole divided into two within, divided with a very thin Scale. Of the external holes
- External holes.*
- 10.
- the,

the first is called, *Superciliare*: the second *Lacrimale*, the third, *Orbitarium externum*; the fourth, *Orbitarium Ethmoideum*; the fifth, above the palat; the sixth in the extremity of the Pallat; the seventh, the cleft under the *Zygoma*; the eighth, and ninth, *Supra Pterigoides*; the tenth *Mastodes*; the eleventh, the external hole of the Eare.

The pits are internal, and external: six are in the internal basis of the Skul; two frontals, two temporals, and two occipitals. The external are seven on each side, to which I add an eight, to wit, the Cavity of the Nose: The first, *Orbitaria*; the second, *Nasalia*; the third, *Zygomatica*, the fourth, above the Pallat; the fifth, under the Pallat; the sixth, *Pterigoidea*; the seventh, in the joynting of the inner jaw; the eighth, in the hole of the sixth Conjugation.

Pits internal.
External.

^a T. 15. f. 3. aaa. ^b f4. bb. ^c f3. bb. f4. aa. ^d F15. f. 3. cc. ^e T. 15. f. 3. ^f Supra K. ^g T. 15. f. 5. aa. f. 6. oo. ^h f4. AB. ⁱ f. 3. D. ^j f. 6. cc. f3. d. ^k f. 6. DD. ^l f. 6. EE. ^m f3. F. ⁿ T. 15. f. 5. ff. ^o T. 20. f. 6. A. f3. B. ^p f. 6. B. C. ^q f. 7. ABC. ^r f. 6. B. ^s f. 9. BB. ^t f. 6. C. ^u f. 9. AA. ^v T. 15. f4. C. ^w f. 5. B. f. 6. F. ^x f. 5. Supra inferius B. ^y f. 5. aa. f. 6. G. H. ^z T. 15. f. 6. G. H. ^a T. 15. f. 5. B. ^b T. 15. f. 5. CC. ^c ibid. ^d T. 15. f. 6. I. ^e T. 15. f. 5. CC. ^f f. 5. aa. ^g f. 5. aa. ^h f. 5. bb. ⁱ f. 5. cc. ^j f. 5. dd. ^k f. 5. ee. ^l f. 5. ^m f. 5. bb. ⁿ f. 5. ibid. ^o T. 15. oo. ^p f. 16. BB.

Chap. 9. Of the uper Jaw.

THe other Parts of the Head, is called the Face; it comprehends both Jaws, and is separated from the Skul, by the first common Suture. *The Face what*

The uper Jaw consists of many bones, about the number of which is some controversie amongst Anatomists; but passing by the vain and foolish opinions of modern Authors, I admit only of Eleven, passing by those portions of the *Ethmoides*, which some Anatomists reckon for several Bones: for those Bones only belong to the Jaw which are separated from the Bones of the Skul; neither are portions of them, but some of those bones contained within the *Orbita*, and form the *Orbita* of the Jaw; with other bones are portions of the bones of the head; as the productions of the *Sphenois*, the broad portion of the *Ethmois*; and therefore they are Childishly referred to the Jaw. *How many Bones in the uper Jaw.*

If any object, That they do belong to the Jaw, because they are beneath the common Suture that divides the Skul from the Jaw; wherefore seeing they are placed Beneath the said Suture, they may be attributed to the Jaw. But if the *Apophyses* of the bones of the Skul, which stick out beyond the roundness of it, be referred to the Face; by the same rule the *Apophyses*, called *Pterigodes*, which stick out without the Globe, and rotundity of the Skul, and are placed in the Same plain with the *Vomer*, and the Angles which sustain the Jaw, are to be reduced to the Jaw it self. And when *Galen* reckons the *Os Sphenois* amongst the bones of the Jaw, he reckons it as a Supernumerary. And therefore we must reckon but Eleven bones of the Jaw.

Five bones are placed on each side, and one without a fellow, which sustains the midst of the Pallar. The first, *Galen Lib. de Off.* Cals a *Melon*: It may be called *Zygomaticus*, because it constitutes the greatest part of the *Zygoma*, and a great part of the *Orbita*, and Angles of the Eye: now *Zygoma*, is nothing else than a bony Semicircle made of two *Apophyses*, by the oblique Suture; of which the one passeth from the rocky bone; the other from the bone of the Cheek. The Second is called *Os unguis*, or *Ossiculum Lacrimale*. *The first Bone of the Jaw.*

3. male. The third is called the ^c greatest bone, and contains the middle part of the Teeth; and finisheth the inferior part of the *Orbita*, and the internal part of the Nose. The fourth bone forms the ^d Nose, and so the Nose is formed of four bones, two are Proper, which we mentioned last; and two common. Modern Anatomists add the bone called ^e *Vomer*, which is placed under the *Sphenoid*, and *Palat*, which was not unknown to *Hippocrates*. It is like a Plow-share, and holds up the bridge of the Nose, to which it is Joyned by *Sutura*, or *Harmonia*.
- 4.

^a T. 15. f. 3. E. ^b f. 3. G. ^c f. 3. I. ^d f. 3. K. ^e f. 6. j.

Chap. 10. Of the Orbitary Bone.

The Orbitary
Bones of the
Eye how many.

THe orbitary bones, which *Hippocrates Lib. de Ossibus* calls *Hypopia* by which the Eye holes are made, were first of all by *Picolominus* pronounced to be five; but he ignorantly pretermitted a portion of the maxillar bone, which joyned to the rest makes six, of which the hole of the Eye is made; but these bones are not Proper, excepting the ungular, or Lacrymal bone, but partly portions of the bones of the Skul, partly portions of the bones of the upper Jaw. The first is the ^a Frontal bone, which makes the fornace of this vault. The second is a portion of the *Sphenoid*, situated in the deep external side of the Eye hole, even to the lesser corner. The third is ^b *Lygomatium*, which makes the lesser corner, and the middle pavement of the *Orbita*, or Eye hole. The fourth is ^c *Maxillare*. The fifth ^d *Lacrimale*. The sixth the Scaly table, of the os *Ethmoid* which makes the other side of the *Orbita*, and the greater Corner: these bones are to be discerned within the *Orbita*, with their Proper and common Sutures.

The error of
Picolominus,
touching their
number.

^a T. 15. f. 3. A. ^b T. 15. f. 3. E. ^c T. 15. f. 3. j. ^d T. 15. f. 3. G.

Chap. 11. Of the inferior Jaw.

Its Parts.

Basis.

Apophyses.

THe inferior Jaw in such as are grown up, is but one bone; in which is to be noted, its basis, and its extremities. Its basis is the middle part of it, hollow within sticking out outwardly and is called the ^a Chin. The extremities are Angles, each extremity lends out two *Apophyses*, of which one is Sharp called ^b *Corone*, and receive the tendon of the temporal Muscle; the other is a ^c *Condyle*, and may be called *Articulatoria*, because it serves for Articulation of the Jaw. Below these *Apophyses* is a Singular ^d hole by which Veins, Arteries, and Nerves pass to the Teeth; one portion of which passeth back again, near the ^e Chin; and is dispersed to the Muscles of the Lips.

^a T. 15. f. 3. L. ^b T. 15. f. 3. M. ^c f. 3. N. ^d f. 3. Infra M. ^e f. 3. L. 1.

Chap. 12. Of the Os Hyoid:

Its parts.

Basis.

THe *Os Hyoid* may be referred to the bones of the Head, because it is fastned by Nervous bones to the *Apophyses* of the *Styloid*. It is Compounded of five small bones, of which that which is greatest and hollow is called the ^a basis, they which ad a sixth and a seventh bone understand the Ligaments wherewith this bone is tyed which as they are usually Nervous, so in some they are observed to be Cartilaginous. From the extream parts of the greater and Fundamental

mental bone, one Cartilaginous^b Horn, which is seldom bony, springs on the top, on each side it is fastned to the Cartilage *Tyroid*, which two Horns are usually num-
bred for the eight and ninth bones.

Horn.

The *Os Hyoid* is the foundation of the *Larinx* and Tongue and by the Judgment of al Anatomists receives the Tongue in its Cavity, but if a man may beleve his own Eyes, they wil shew him that the *Epiglottis* only is received in its Cavity, and that the Tongue resteth on the uper side of its Basis.

Error of Anatomists.

^a T. 13. f. 11. 12. A. A. ^b T. 13. f. 11. 12. B. B.

Chap. 13. Of the Teeth.

THe Teeth, are the instruments of Chewing the Mear, and forming the voyce. They are bones although they differ in Nature from other bones.

Their Nature

They consist of two parts, one of which sticks out without the Gum, and is called the Basis. The other is hid within the Gum, and called the Root, the Root is not solid but hollow, and so hollow, that it receives a smal Vein, a smal artery, and a smal Nerve.

Parts, Basis and Root.

The Roots of the Teeth are various in number and diverse in figure. The Root of the Cutters is alwaies simple and right, distinguished only with a smal cleft for their firmer sticking. Also the Roots of the Dog-teeth are simple. The superior grinders have a threefold Root and Crooked, because they hang downwards, in the inferior grinders they are double and sometimes treble.

The number of the Roots of the Teeth.

The number of the Teeth is various in regard of Age. In Children from the seventh Month even til they are two years Old and upwards; twenty of them usually come out by degrees one after another, and before they are wel towards four years of Age, they have no more, afterwards eight, or twelve others come out: So that they have twenty eight, or thirty two in both Jaws.

The number of the Teeth.

This number is distinguished into three orders by reason of their Situation and bigness, the first four Teeth are called ^aCutters. Those two which are next these, one on each side, are called ^bDog-teeth. The rest being eight, or ten, are called ^cGrinders, They are placed in the Cavities of each Jaw, which Cavities are not continual but divided into Cells, and their conjunction, or Articulation is called *Gomphosis*.

Their Orders.

^a T. 15. f. 6. M. ^b T. 15. f. 6. n. ^c T. 15. f. 6. oo.

Chap. 14. Of the Trunk, being the Second Part of the Skeleton.

THe Trunk comprehends the Back-bone and such bones as are fastened thereunto.

Of what it consists.

It is compounded of the Back-bone and the Chest.

The Back-bone is a bony Channel which gives passage to the Marrow of the Back, and is stretched even from the Head, to the *Os Coccyx*. It consists of very many bones for its security and that it may not easily be hurt, as also that a man may bow himself, for necessity of action. these bones the Greeks cal *Spondils*, and the latins *Vertebrae*.

The Back-bone what.

In every *Vertebra* you may observe two parts of which the one is internal, thick and round, and is called the body: the other external with various *Apophyses* and hath no Name, the differences of the *Apophyses* are three, right, Oblique, and transverse, the hindmost is sharp and is Properly called ^a *Spina* that which is ^b Lateral, and the transverse is double, the ^c Oblique fourfold by which they are joyned together by *Ginglymos* in which three bones are required.

Two parts of a Vertebra.

Difference of the Apophyses.

The Vertebrae
of the Neck,

In the Oblique *Apophyses* two are above, and as many below; and therefore in all the *Vertebrae*, are seven *Apophyses* found. The whole *Rachis* or Back-bone, is divided into four Parts. The Neck, Back, Loyns and *Os Sacrum*: The Neck hath seven *Vertebrae*, the Back twelve, the Loyns five, the *Os Sacrum* is either one, or three-fold in such as are grown up; in Children it is divided into five or six Parts: Wherefore the Back-bone in such as are grown up, is composed of twenty four *Vertebrae*; to which, if you add the *Os Sacrum*, which is a great *Vertebra*, it maketh twenty five or twenty seven. The crooked-straight Figure of the Back-bone, which is admirably described by *Hippocrates* in *Lib. 3. de Articulis*, from verſe 33. to 35. Cannot be noted in a Skeleton, though never so exactly made; but in a Carcase the Flesh of the Back being taken away it may; in the *Vertebrae* of the Neck, this peculiar thing is to be noted, That all the transverse *Apophyses* are pierced through, that so they may give passage to the cervical Veins and Arteries; they have Cavities in the extremities, through which the Nerve being yet soft, is deduced: The hindermost *Apophyses*, are double, for the rise and insertion of Nerves; but the two superiors have another structure and conformation, by reason of the motion of the Head; for the first wants a *Spina*, and hath a thick round Body; the second sends out a s Tooth like *Apophysis*. All the *Vertebrae* of the Neck are stricktly joyned and implicated lest they should slip asunder in the vehement Motions of the Neck.

The vertebrae
of the Back.

The twelve *Vertebrae* of the Back, are altogether one like the other: their *Apophyses* are all solid, and continual, without any hole or division. The twelfth, or eleventh *Vertebra*, hath a different Articulation from the rest; all the rest are joyned by *Ginglymos*; the eleventh, or twelfth, only by *Artbrodia*. And therefore the whole Motion of the Back-bone, bowing, extending, and Obligation, is performed by that *Vertebra*.

The Vertebrae
of the Loyns.

The five *Vertebrae* of the Loyns, differ in *Apophyses* from those of the Back; for the hinder *Apophyses*, or *Spinae*, do not descend as they do in the Back, but are straight, and broad: the transverse *Apophyses* are longer, and stand instead of Ribs.

Os Sacrum.

Under the Loyns is the *Os Sacrum*, which though it seem one simple bone at the first view, yet being boyled a long time in Oyl, it is divided into five parts, and sometimes into six.

Coccyx.

To the extremity of the *Os Sacrum*, is another cartilaginous bone joyned, which is divided into three, seldom into four Parts and is called *Coccyx*, the Grupper-bone.

^a T. 2. f. 2. d. ^b f. 2. bb. ^c f. 2. cccc. ^d T. 13. f. 20. bb. ^e f. 21. b. ^f f. 20. ^g f. 21. a. ^h T. 10. f. 3. ⁱ T. 2. f. 2. d. ^k T. 2. f. 1. aa. ^l T. 2. f. 5. 6. ^m T. 2. f. 5. bb. c.

Chap. 15. Of the Chest.

The Breast
what.

THE Chest, together with the Back-bone, make up the trunk of the Skeleton.

The Chest is a bony Circumference, which holds the vital Parts, and is constituted of a four-fold kind of bones; the *Sternum* before the Ribs on each side, the *Claviculae* at top, and the Back-bone behind, to which the Ribs stick.

The Sternum.

The *Sternum* or Breast-bone, in such as are grown up, is one only continued bone, distinguished by three or four transverse lines, which are but the footsteps of the Antient divisions; and these lines are more conspicuous on the inside, than on the out.

The Cartilage
called Sword-like.

On the extremity of this bone, depends the Cartilage or Gristles called *Xyphoides*, or the sword-like Cartilage; it represents a Shield in brutes.

The Ribs.

The Ribs are twenty four, twelve on each side; of which, the seven upper most are called *True*, because they are committed to the *Sternum*; the other five inferior

ferior, are called ^d *Bastard*, because they are never joyned to the Breast-bone, but are joyned in a Cartilage, that they may the better give way to the swellings of the Liver and Spleen, and yeild to the Motions of the *Diaphragma*.

The ^c *Claviculae* are two, one on each side; whose Figure represents an *Italica* S. They retain the *Scapula* in its Proper feat that it fal not upon the Breast.

Claviculae.

^a T. 10. f. 2. A. A. ^b f. 2. B. ^c f. 2. 1. 2. 3. 4. 5. 6. 7. ^d f. 2. 8. 9. 10. 11. 12. ^e f. 1. f. T. 21. f. 2. A.

21. 10. 210

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Chap. 16. Of the Limbs, being the Third Part of the Sceleton: and first, of the Scapula.

Seeing the *Scapula Omoplata*, or shoulder-blade, belongs nothing at al to the constitution of the Breast, I seperate it from the Trunk, and set it at the beginning of the hands. In the *Omoplata* many Parts come to be noted for the original and Insertion of Muscles. A very Necessary Part of the *Omoplata* being stretched to the Longitude of the Back, is called the ^a *Basis*, the extremities of which are called Angles; one is ^b *Superior*, the other ^c *Inferior*. The *Basis* is the sides of the *Ribs*; of which, the one is shorter and thinner, which is called the ^d *Superior Rib*; the other longer, and thicker which is called the ^e *Inferior Rib*. The whole Latitude of the *Scapula* is called the table; The external Part of which is Gibbous; the internal hollow, that so it may receive the Muscle. The famous process or *Apophysis* ascending upwards from the basis, is called ^f *Spina*, the broad extremity of which, is called *Acromium*; which according to *Galen*, and *Hippocrates*, is a distinct bone, and Cartilaginous in Children; but hard, and bony, in such as are grown up. Which after the twentieth year, and something sooner is turned into an *Apophysis* of the *Spina*. The pits on each side of the *Spina* are called *interseapulum*; one pit is above it, the other below it, but the middle prominence of the *Spina* which is bowed, is commonly called *Pterygium* or the crist. The other extremity of the *Scapula*, which is great, subject to the *Acromium*, and opposite to the *Basis*, is called the ^g *Neck*; in it you shal note, that *Apophyses* called ^h *Coracoides*, which was made for the security, and firmness of the Joynt of the Shoulder, the Cavity of the Neck, is called *Glenoides*.

Its Parts.

Basis.

Angles.

Ribs.

Process.

Pits.

^a T. 21. f. 2. bb. ^b f. 2. f. ^c f. 2. g. ^d f. 2. ab. f. ad. d. ^e f. 2. ag. ad. c. ^f f. 2. e. ^g f. 2. c. ^h f. 2. d.

Chap. 17. Of the Shoulder.

The Arm hangs upon the *Omoplata* or *Scapula*, which is divided into three Parts; the *Shoulder*, the *Cubit* and the *Hand*. In the *Shoulder* are two extremities for the insertion of Muscles; the uppermost is called the *Head*, which a membranous Ligament, bred from the Cavity of the *Glenoid*, compasseth about, besides the four Muscles which it involves: a little below this, the Orbicular narrow place, is called the *Neck*. In the *Head* is a long Chink, by which the Nervous Head of the Muscle *Biceps* ariseth. In the other extremity of the Arm, you may observe the *Trochlea*, about which the *Cubit* is turned: About the *Trochlea* are two ^a *Cavities*, of which the external, is wider than the internal; in these are the *Coronal Apophyses* of the *Cubit* received: with the *Trochlea* are two *Apophyses*, which are called *Condili* the one inferior, and interior; the other superior, and exterior.

The three Parts of the Hand.

The Head of the Bones of the Shoulder.

The Neck.

Trochlea.

Cavities.

Apophyses

^a f. 2. f.

Chap. 18. Of the Cubitus, and Radius.

Radius
Cubitus
why there are two bones.

THe second Part of the hand is called *Cubitus*, & consists of two bones; of which the one which is superior and shorter, is called ^a *Radius*; the other, which is inferior, and subject to the former, is called by the Name of the whole ^b *Cubitus*, and by some *Ulna*. Two bones are necessary in this Part of the Arm by reason of their double and contrary Motions, which could not be performed by one bone united by *Ginglymus*; for *Ginglymus* suffers only bowing and extending, and in no wise inversion; which the *Radius* being joyned by *Arthrodia* performs. The Obliquation of the *Radius* cannot perfectly be discerned unless in a new carcass, all the Muscles being taken away; for with great admiration you shal see the *Radius* turned about, upward and downward, upon the Cubit, being unmoved and also moved together with the *Cubitus*, when it is bowed and extended.

Cavity.
Apophyses.

There is something worthy the noting in the extremity of the *Cubitus*: For in the upper extremity, is the Cavity, called *Sygmoides*, which embraceth the *Trochlea* of the Arm; about this, are two *Apophyses*, called *Corone*; the lowermost is called ^c *Olecranium*: In the inferior Part the *Cubitus*, is an *Apophysis*, which is called ^d *Styloides*; the extremities of these bones alone, are joyned together by that *Ginglymus*, which consisteth of two Bones, passing into one another, in diverse, and distant places.

^a f. 2. E. ^b f. 2. D. ^c T. 21. f. 2. g. ^d f. 2. e. regione. ^e

Chap. 19. Of the Hand.

Division.

THe Hand is divided into three Parts *Carpus*, *Metacarpus*, and the *Fingers*.

Carpus.

^a *Carpus* consists of eight bones, distributed into two orders, which are joyned amongst themselves by *Symphysis*, by a kind of *Harmonia*; because the bones of the *Carpus* are moved the one from the other, either obscurely, or not at al: the first order makes *Arthrodia Diarthrodia*, with the inferior Cubit; the same order is joyned with the second order of the bones of the Wrist, or *Carpus*, by *Arthrodia*; which second order is joyned with the *Metacarpus*, by *Arthrodia Synarthrodia*: So that this Motion, is either none at al, or insensible; but the first order with the second is moved obscurely.

Metacarpus.

The ^b *Metacarpus*, succeeds the *Carpus*, and is framed of five bones, if we add the first bone of the Thumb, which some reject, because it is Obliquely added to the *Metacarpus*, and endewed with manifest Motion and contrary to the Nature of other bones of the *Metacarpus*, which make *Arthrodia* with the Wrist, and *Enarthrosis* with the *Fingers*; and yet the fourth bone of the *Metacarpus*, which sustains the Ring Finger, hath manifest Motion.

Fingers.

From the several bones of the *Metacarpus*, are several ^c *Fingers* stretched; only the Thumb excepted, the *Fingers* consist of three bones which are joyned to one another by *Ginglymos*; and therefore they admit only of bowing, and extending; the Oblique Motion of them depends upon the *Enarthrosis* of the first bone with the *Metacarpus*.

^a f. 1. FF. f. 2. F. ^b T. 21. f. 1. GG. f. 2. G. ^c F. 8. f. 12. C D E.

Chap. 20. Of the Bones of the Ilium.

THe greatest and largest bones of the body, which being joyned with the *Os Sacrum*, sustain and erect the whol Trunk, are by the greatest Part called *Ossa Ilium*: In such as are grown up, they are one bone; but in Children divided into ^a three Parts; which yet hold their ancient appellations, though the very Foot-steps of them be obliterated by Age. The broader Part of the bone which frames the latitude of it, and is stretched out to the middle of the funnel, is called ^b *Ilium*; the other halfe, and superior Part, is called ^c *Pubis*; the other inferior Part ^d *Ischium*: Of these three portions, is made that great hole called the ^e the Funnel.

Its Parts.

Ilium.

Pubis.

Ischium.

In these bones some particular things are to be noted; for Anatomists call the external Face of the *Os Ilium*, the *Back*; the superior internal Cavity, they call the *Belly*; the extremity of which, is called the *Rib*; the brims of which, both external, and internal, are called *Lips*, or *Brows*, so as one is external, the other internal. The extremity of the *Rib*, which sticks out, and is joyned to the *Os Sacrum*, is called the *hinder Spine*. And the other ^f extremity of the *Rib* towards the Funnel, is called the *foremost, upermost Spine*. There is under this, another called the *former and nether Spine*.

Back.

Rib.

Lips.

Spines.

In the *Os Pubis*, a *Spine* is observed neer the *Symphysis*, by its top: In the *Ischium*, a *Spine*, and a *Bunch* is noted; which *Bunch* is called *Condylus*.

^a T. 8. f. 12. C D E. ^b T. 2. f. 3. A. ^c f. 3. C. ^d f. 3. B B. ^e T. 21. f. 4. B. ^f T. 2. f. 4. aa.

Chap. 21. Of the Bone of the Thigh.

THe Feet, as wel as the Hands, are divided into three Parts; the *Thigh*, *Leg*, and *Foot*.

The Bone of the Thigh is but one, and the greatest in al the Body. In the superior excremity, the ^a *Head* is round, to which a slender part is added, called the *Neck*: from the Neck are two *Apophyfes* produced, to which, the Muscles called *Rotatores*, are fastned; and therefore they are called *Trochanters*; the foremost is called the lesser ^b *Trochanter*; the upermost, on the side, the greater ^c *Trochanter*. The other extremity of the Thigh, hath two ^d *Condyls*: a ^e Cavity being left between, which admits the ^f middle, and eminent *Apophyfis* of the Leg; and in like manner the *Condyls* are received by the ^g Cavities of the Leg, by a loose ^h *Ginglymus*, the fore Part of which, is called the *Knee*, the hinder Part the *Ham*: this Articulation is strenghtned before, with a smal bone, called the ⁱ *Knee-pan*, which is Articulated to no bone.

The Thigh Bone.

Head.

Neck.

Apophyfes.

Knee.

Ham.

Knee-pan.

^a T. 21. f. 1. dd. f. 4. a. ^b f. 1. gg. f. 4. c. ^c f. 1. ff. f. 4. b. ^d f. 1. bb. f. 4. ee. ^e f. 4. d. ^f f. 4. f. ^g f. 1. bb. f. 4. ee. ^h f. 8. cc. ⁱ f. 1. LL. f. 8. d.

Chap. 22. Of the Leg.

THe Leg is composed of two bones; of which, the greater, and internal, is called ^a *Tibia*; The lesser, and external, ^b *Fibula*. The *Fibia* is Articulated by *Ginglymos* to the Thigh; the *Fibula* sticks to the *Tibia*, and toucheth not the Thigh. The inferior, and bunchy Parts of them both, are called *Angles*; of which, the *Fibia* makes the ^c internal, and the *Fibula*, the ^d external.

Two Bones of

the Leg.

Tibia.

Fibula.

^a f. 1. M. f. 4. D. ^b f. 1. M. f. 4. D. ^c f. 1. ii. f. 4. gg. ^d f. 1. KK. f. 4. b.

Chap. 23. Of the Foot.

Division.
Tarsus.

The Foot is divided into the *Tarsus*, *Metatarsus*, and *Toes*. The *Tarsus* consists of seven Bones, which *Ruffius Ephesus* calls *Ostracodea*, by reason of their hardness: The first Bone Articulated with the *Tibia*, is called *Astragalus*, or *Talus*: The Bone under this, *Pterna*, or *Calcaneum*: The third joyned to the *Astragalus*, *Scaphoides*: The fourth *Naviculare*; to which is joyned the inner, and foremost portion of the Heel, which is called *Cuboides*; the other three have no Names, or Else are called *Calcoidea*. The *Metatarsus* follows the *Tarsus*, and is formed of five Bones, and answers to the *Metacarpus* of the Hand.

Metatarsus.

Toes.

The *Toes* succeed the *Metatarsus*, constituted of three Bones apiece, except the great Toe, which hath only two Bones: small Bones fill up and strengthen the inter-nodes of the Fingers and Toes in such as are grown up, which are uncertain in number, and called *Sesamoidea*.

In the second Articulation of the great Toe, are two small Bones worth the noting, and indifferent big, which are alwaies found in all Carcasses, and two at the original of the two Muscles of the Feet, mentioned by *Vessalius*, which are but seldom found, and are to be numbred with the *Sesamoidea*.

f. 5. A. f. 5. B. f. 5. C. f. 5. D. f. 5. e. e. f. 4. g. f. 4.
f. 5. T. 21. f. 6.

Chap. 24. In what Particulars the Bones of Men differ from those of Women.

Those which
differ are.

The Bones of Men and Women, differ in some parts, which *Platerus* first noted, and *Baughinus* follows him; but by their leaves, they noted many differences which are not found, and omitted some that are: we shall speak of them both severally.

In Substance.
of the Bone.

It is true, all the bones of Women, are less then those in Men, both in weight, and thickness, as also in length. *Galen* adds they are not so hard, but saith, that in all living Creatures, the Bones of the Females, are softer then those of the Males; and *Aristotle* held so before him.

The Bones of
the Head.

The bones of the Head, are altogether alike, having neither more, nor fewer Sutures; although *Aristotle* thought otherwise; Namely, that Males had more Sutures then Females, Ch. 7. Lib. 1. de hist. animal. and 7. Lib. 3. ejusd. operis, and Chap. 7. Lib. 3. de part animal. Yet the *Sagittal Suture*, more often in Woman, passeth to the Nose, dividing the Bone of the Fore-head in the middle.

Teeth.

It is false that *Aristotle* held, Viz. That Males have more Teeth, then Females, as is clear in Men, Sheep, Hogs, and Goats.

Larynx.

The *Larynx* (if it may be numbred amongst the Bones) is less in Women, and the *Cartilage Thyroides*, sticks out less.

Breast.

The Breast in Women is depressed in the fore part, and sticks not out as it doth in Men, for the more accomodation of the Dugs.

Clavicula.

The *Clavicula* in Women are not so crooked, for the more comeliness of their Neck and Breast.

Sternum.

The inferior Part of the *Sternum*, is broader then in Men, and many times hath a manifest hole in it; and the lower Bone upon which the *Sword-like Cartilage* depends, is cleft like a crescent Moon and makes a large hole for the *Egreis* of the *Mammaria Interna*.

Cartilages of
the Ribs.

It is false that the *Cartilages*, which in men become bony about the forty or fifty years of their Age, become bony in Women so soon as their Breasts grow; Though it be true in Women when they are Old.

In Women with great Breasts, *Thorax* is narrow, and almost poynted, by reason of the weight of their Breasts. That

That Part of the Back above the Loyns, is no more bowed Backwards in Women, then it is in Men.

Back.

The *Os Sacrum* is shorter, broader, and more bowed outwards in Women, then it is in Men.

Os Sacrum.

The *Os Coccyx*, or Crupper Bone, is more movable, and not so strongly knit, and more bowed Backwards in Women; not according to the opinion of *Galen*, but of Later writers. *Galen: Lib. 1. de Semine.*

Coccyx.

The Buttocks of Women are broader and according to *Aristotle, Lib. 4. de hist animal.* Women are stronger in their lower Parts, and therefore the *Os Ilium* most commonly is larger, but that largeness bends more outward; by which means the *Ossa Ilium* are more hollowed outwardly.

Buttocks.

Os Ilium.

Upon this largeness of the Bones, the Womb when it is great with Child leans as it were, upon Pillows, and sits as it were in a Saddle. Elegantly said *Galen Lib. 14. de usu Partium*, when he called the concourse of these Bones with the *Os Sacrum*, **THE GREAT BONY VAULT** or Arch. The oval hole is smaller in Women than the portion of the *Os Pubis*, neer the *Symphysis*, may be larger; but the *Spina* of the *Os Pubis* is turned outwards.

*Os Pubis.**Os Ischium.*

The inferior, or tuberos Part, of the *Os Ischium*, is fitted with a double Cartilage, thicker softer; and this commissure is perfected by a short line, that in the travail, it being softened and loosed, the Bones of the *Pubis* may part.

The space between the *Os Sacrum*, *Ilium*, and *Pubis*, where they are joyned together, is larger in Women then in Men, least the narrowness of the Passage should hinder the coming out of the Child. The rest of the structure of Bones in Women, is like those in Men.

* T. 15. f. 3. bb. ^a f. 3. A. ^b f. 6. m n o. ^c T. 13. ad f. 10. ^d f. 8. A. ^e T. 10. ^f T. 21. f. 1. R. ^g T. 10. f. 2. A A. ^h f. 2. B. ⁱ f. 2. C C. ^j T. 2 f. 5. and 6. ^k f. 5. and 6. b. c. ^l f. 3. and 4. A. ^m f. 3. 4. b. ⁿ f. 3. 4. C.

Chap. 25. Of the number of the Bones in a Mans Body.

THe number of the Bones of mans Body amongst Anatomists is uncertain *Vesalius* held 307. *Galen* 242. But in the *Skeleton* of a perfect man, there are two hundred and fifty six necessary Bones for the structure of it; which are thus numbred. Of the Skul, eight; of the upper Jaw, eleven; of the nether Jaw, one; of the *Os Hyois*, three; Teeth, thirty two; Back-bone, twenty four; *Os Sacrum*, three; *Coccyx*, three; *Clavicula*, two; Ribs, twenty four; of the *Sternum*, three; of each Hand, divided into four Parts, sixty two; *Omoplata*, two; Armes, two; Cubits, four; both Wrists, sixteen; both *Metacarpus*, eight; of all the Fingers, thirty; of each Foot, divided into four parts, sixty two; Namely the Bones of the *Ilium*, two; Thigh, two; Legs, four; *Kneepans*, two; *Tarsus*, fourteen; *Metatarsus*, ten; Toes, twenty eight.

Besides these Bones, whereof the *Skeleton* is made, there are eighteen other manifest smal Bones, In each great Toe four, *Sesamoida*; in the Head of the Muscles, called *Gemeli*, on each side, four. The rest of the *Sesamoida* are so smal that they consum or vanish away in boyling the Bones to make a *Skeleton*.

There is in each Eare three smal Bones, which ought to be kept apart with the *Sesamoida*; neither come they into the structure of the *Skeleton*. So that if you add the first number to the second, you shall find two hundred and fifty six Bones.

Chap. 26. The History of an Infants Bones, till the Age of seven years.

SEEING the Bones of Infants, from their Birth til seven years of Age, differ much from the Bones of such as are grown up, both in number, and figure, and especially

especially in the Multitude of *Epiphyses*, and defect of *Apophyses*, therefore I thought it well worth the while, to ad the Bones of Infants, to the Bones of men grown up, that the difference between them may appear more evidently, for this comparison makes much to take away the differences amongst Anatomists; and to untie the difficult knots, you shall find in *Galen's* Doctrine of the Bones.

Is Ancient.

That this Osteology, was known to *Galen*, is manifest by various places in him; in which he declares the Bones of Infants, in his Book of the formation of the Child in the Womb, he describes the Head of the Infant, In the first book *De semine*, he treats of the Teeth of Infants, but before *Galen*, *Hippocrates*, was a diligent studier and observer of this Osteology; as his divine monuments of the Nature of Children, and of their breeding Teeth witness.

And profitable.

And the profit of this Doctrine is very great: not only in the education of Children, which are marred, by the unskillfulness either of the Midwife, or Nurse. We see diverse Children at this day Borne, with great Heads, Bunches, Bow-Legs, great Ancles, Unseemly knees, and at last are Lame when they begin to go, which deformities in the beginning of their Age, whilst their Bones are soft, may be amended, and how can a man amend them rightly, unless he know the Bones at that time exactly?

Excellently said *Galen*, in *Lib. de causis Morborum Chap. 7.* When he describeth the deformities of Bones, which are in Children. The Natural figure, (saith he) of the members, and of the whole Body, is changed either in the Womb; or at the Birth, or after the Birth; It is depraved in the Womb when the formation is vitiated, by reason of abounding, or unfit matter, It is depraved in the Birth, when the Midwife takes it not rightly, or binds it not up rightly, being born, after the birth the Nurse, in taking of it up laying it down, or carrying of it, or washing of it, or binding it up; in all these the Nature of every member is easily turned out of its course, and corrupted. These also happen in unfit Motions, whilst it is set to stand or walk, before its time, or exposed to vehement Motions. For unseasonable, and vehement motions weaken the Limbs, and the Legs, are turned inwards or outwards by the waight of the Body; and those Limbs which should be straight are made crooked, the Parts of the breast are usually inverted by Nurses; by binding them too hard, in their first education; this we see almost continually in Virgins, whilst Nurses study to encrease those parts, which are about the Hips and Bowels that, they may exceed the bigness of the Breast, they bind the Parts about the Breast so vehemently, that the breast becomes sharp, and they look as though they were broken back; and sometimes are crooked Shouldered.

You see by *Galen*, what miseries and deformities little Children are subject too; by reason of ill forming the Bones, which may be corrected whilst they are Young, and Flexible, and brought into what form you will.

Hippocrates *Lib. de Septimestri Partu*, gives the reason, why Children are Born Blind, Lame, or other wise ill formed; The Women that go with such Children are ill, or like to miscarry, in the eight month, for the maimed Embrion was greivous Sick, in the eight month; and the Disease, Caused, *Impostumation*, as it doth in men, but when the Embrion is main sick, at any other time it rather dies, then suffers *Apustumation*: Hitherto *Hippocrates*, and *Aristotle* writes *Seet. 10. Probl. 40.* That Children may be hurt in the Womb, because their Legs are so tender.

The Marrow of the Bones Bloody.

The greater Bones of Infants are hollow, and the Marrow Bloody. After six Months, the Marrow waxeth white, they have a *Periostion*, and a Cartilage at the ends, the extremities of the Bones, are *Epiphyses*, some few *Apophyses* they have, but a great number of *Epiphyses*, that according to *Ingrassias* they amount to, three hundred twenty one. But I think 'tis no such matter, neither indeed, have I yet been very sollicitus about, the counting of the number.

Their Epiphyses.

How they wax hard.

I never observed any Bone, of any bignes or length; which ended not in an *Epiphyses*; now all the *Epiphyses* of Infants are Cartilaginous, and grow hard, and are turned into Bones by degrees: Their hardness begins not at the Bone, to which they

they are joyned, but they take their bony substance first at the Centre beginning at the internal part and encreasing by degrees to the external. Or from the Centre to the circumference, outwardly they grow dry and hard by heat which is stirred up by Motion and rubbing the Joynts one against another in walking.

Chap. 27. *Of the Head.*

THe Sutures of the Head seem to be rather *Harmoniae*, distinguished by a Line, and not joyned together like Teeth of a Saw by mutual ingress. The joynings of the Skul are loose, so loose that they suffer the *Dura Mater* to pass out for the forming of the *Pericranium*. The Sagittal Suture alwaies passeth to the extremities of the Nostrils, but very seldom descends by the hinder part of the Head to the hole of the Marrow of the Back. The coronal Suture hath a membranous gaping at which place the pulsation of the Brain may be both seen and felt, this place is vulgarly called a *Fontanella*.

The Sutures

Sagittal.

Coronal.
Fontanella.

The temperal Bone seeing it is framed of two parts scaly and rocky, the parts of it are distinguished by *Harmonia*, which is not disannulled above the hole of the Eare, but beyond it, about the *Apophysis Mastoïd*.

The Bones of the Skul are very thin, neither shal you find the two tables or plates in them, before one year be Elapsed, between the Bones is some disparity because the Bones of the hinder Part of the Head are the thinnest, contrary to what they are in such as are grown up, at the concourse of the sagittal and coronal Suture is a cleft called *Rhomboides*, which a thick and hard membrane shuts and grows bony in process of time.

Bones of the
Skul.
Their thick-
ness.

The Frontal bone is alwaies two without any sinuous Cavity, the bone of the hinder Part of the Head in Children new born, most commonly consists of four bones eventil they are a year Old. The first is the whol and superiour breadth of the bone which compasseth and embraceth the *Cerebellum*, this is rarely divided, and yet there is a certain cleft in the top, caused by the sagittal Suture produced thither. The Second and third portion make the sides of the hole of the Marrow of the Back, and the middle part of the Circle. The fourth bone is placed in the extremity of this, and makes a portion of the great hole, this as yet I never observed. A transverse Line intersects the circle as though it were two. The Bones of *Bregma*, at the concourses of the sagittal and coronal Suture, are imperfect by reason of the *Fontanella*.

Of the Fore-
head.

Bregma.

The Bones of the Temples are manifestly seperated into two Parts, scaly and rocky; neither the *Epiphysis* called *Stylois* nor the *Apophysis* called *Mastoïd* appear in it, only the *Zygomatica* is seen, but that part of the rocky Bone subject to the hole of the Eare, makes the basis of the Skul, it is called next to the *Sphenois* and next to the *Lithois* by some, but may be called *Auricularis*, because it comprehends the whol structure of the Eare, in Children it is an *Epiphysis* which easily is severed, and this is often observed in the Sculs of brut Beasts that are grown up, in which not with standing it is other wise framed.

Bones of the
Temples.

In this auricular *Epiphyses* many things come to view, the passage of hearing is altogether Cartilaginous, about the fift or sixt month it begins to be bony, and yet it may be seperated even to the seventh month, but in the basis it is hollowest, even to the third year and longer.

Passage of the
Eare.

But proceeding inwards to the extremity of this passage there is a bony circle to which the *Timpanum* is fastned, this also is easily severed, but when the passag of hearing grows hard, the bony circle is so strongly knit to it, that it is inteperable. The Cavities are very straight; neither can the admirable structure of the Labyrinth be perceived in Boies, and yet that which is wonderful the three little Bones of the Eare *Malleolus*, *Incus* and *Stapes*, are of the same substance, bigness and form, even from the birth to extrame Old Age.

Bony Circle.

The *Os Sphenois* is divided into four Parts according to *Fallopins* of which the

Os Sphenois.

process

process called *Pterigoides*, constitute two; the seat which receives the *Glandula Pituitaria*, a third; The fourth part is subservient to the optick Nerves, which portions grow together, not long after the Nativity: but *Fallopian* very ill described these portions of the *Sphenoid*; for the third comprehends the seat, or Saddle, and also is subservient to the optick Nerves: The fourth is stretched out below the Saddle, even to the *Corone* of the hinder part of the Head, and that division remains Conspicuous, even till three or four years be passed. In this Bone, are no winding Cavities; and the *Os Ethmoid*, is totally Cartilaginous; the bridge of the Nose is bony at first, but grows hard along time after the other parts.

The Bones of
the Eye-holes.

In the Eye-hole of such as are grown up, are six bones noted, *Zygomaticum*, *Sphenoides*, *Frontal*, *Ethmoides*, *Lacrymal*, and *Maxillare*: The portion of which makes the pavement in Children, and is levered with a kind of Suture, which remains even till three or four years of Age.

Upper Jaw.

The Lines, or *Harmonia* of the upper Jaw, are like those, in such as are grown up, a certain cleft only appears in the brim of the *Inferior Orbita*. In the beginning of the *Pallat* is a transverse line espied, which is stretched from one of the Teeth, called Cutters, to the other; and comprehends the four Cutters. As for the bones they are like the bones of such as are grown up, both in figure, number, and Situation. The Jaw-bone is not hollow, and the cels of the Teeth are covered, and as it were stopped up with a membrane.

Inferior Jaw.

The *Inferior Jaw* in the midst, where the Chin is, is divided by *Harmonia*, and so consists of two parts, so continuing till two years be past.

Teeth.

The Teeth are ingendred in the Womb, when the rest of the parts are ingendred; but within the holes of the Jaws: they are in number twenty, ten in each Jaw; of which, are four Cutters, two Dog Teeth, and six Grinders, they all want Roots.

They begin to pass out of the Gums about the seventh Month, sometimes sooner if the Nurser's Milk be very hot. Some few have Teeth when they are borne as, *Cneus Papyrius Carbo* and *M. Curtius*.

At what time
they appear.

They do not break out altogether, but by degrees, in two years space; and the upper Teeth usually, come out sooner than the lower: first of all the Cutters, afterwards two Grinders, then the Dog Teeth; the breeding of which, is most painful to Children.

When Children have twenty Teeth, then they usually say, they have all their Teeth; neither indeed have they more, before they are three or four years of Age.

where the
Grinder Teeth ly.

But when Anatomists say, that there is only twenty Teeth contained in the Gums, They do not tell you where the other Eight or twelve reside; neither doth it seem like a truth, that new Teeth should be bred after the other are formed, and lie hid in the Gums. In the upper Jaw I have observed the other four, or six, hid under the *Zygoma*; but those of the lower Jaw under the extremity of the same, where they lie hid like points. Under the coronal *Apophyses*, because the space of each, seems at the Narrowest, to comprehend twenty eight, or thirty two Teeth.

when they
break out.

Neither do these eight or twelve Teeth break out before the Jaws are made larger, which hapen about the fourth year of the Age: but contrary to the Nature of other Teeth, they continue as long as life continues: neither do they come out, as the other twenty teeth do; neither being plucked out, do they grow again.

Their genera-
tion.

Their generation is two-fold; one in the Womb, the other without the Womb; for in the Womb the Teeth are formed with the other parts, but are imperfect. Within each hole, is contained a Mucous, and hardish substance, concluded in a little white Membrane, which grows dry, and take a bony Nature by degrees, and to get out pierceth the Gum with its top; the Membrane compasseth the hole round, and like Glue retains the Tooth: The other portion, namely, the Root of the Tooth, remains still within the hole, being soft and Mucous, as the Feathers of Birds

Birds are; but it grows hard by degrees, and is parted in the middle, into three or, four Roots.

Under these Teeth, in every hole, is subjected the Seminal matter of another Tooth, a Membrane passing between them; which whilst it is fermented by the formative faculty, and growing up, it expels the former. This second matter thus included with a membrane, hath deceived many Anatomists, which thought the Teeth consisted of two Parts; and that other Part of the Tooth, was an *Epiphysis* of the Root: therefore *Vesalius*, and *Columbus*, held the Teeth in Children, ought not to be pulled out by the Roots, but transversely to be broken off, as thinking that a new Tooth grew up from the same Root, which could never be, if the former were pulled up by the Root. But *Celsus* in my Judgment wrote more truly, that there was a new Tooth in Children, which did expel the former, and sometimes grew out besides it, either above, or below it.

The middle part of the *Hyois*, being the basis of the whol bone, is Cartilaginous, but soon becomes bony; and yet the sides remain Cartilaginous a good time.

Hyois.

^a T. 15. f. 4. C. ^b T. 8. f. 4. C. ^c T. 8. f. 4. A. A. ^d f. 4. B. B. ^e T. 8. f. 5. ^f f. 7. and 8. ^g f. 6. A. ^h f. 6. A. ⁱ f. T. 8. f. 6. C. ^k T. 8. f. 4. D.

Chap. 28. Of the Back and Breast-bones.

THE Back-bone consists of twenty four *Vertebrae*, the *Os Sacrum* excepted: all of them for one years space, are divided into ^a three parts, the two first of the Neck excepted: the first part constitutes the Body; the other two make the sides of the hole, neither do they send out any process. *Fallopins* hath seen the first *Vertebra* of Children constituted of five parts; but the rest, of three only. The first part was where it was joyned with the Tooth of the second *Vertebra*, called *Pyrenon*; the second, and third parts, were on the sides, in which both the superior, and inferior Cavities of the Joynts were; the fourth, and fifth parts pertained the rest of the hole. The second *Vertebra* of the Neck, besides the three parts common with the rest, hath a fourth eminent *Epiphysis*, called *Pyrenon* or the Tooth.

The Vertebra

Fallopins his Observation.

In all the *Vertebrae*, the hinder part is ^b Acute, and altogether Cartilaginous, and then grows bony, and like an Appendix is joyned to the other parts. The transverse processes, are also Cartilaginous, but soon acquire a bony Nature.

The *Os Sacrum* consists of ^c five *Vertebrae*, with Cartilages between: So as they may easily be discerned the one from the other: the hinder sharpness is totally Cartilaginous.

Os Sacrum.

All the *Vertebrae* consist of three parts, as all the *Spines* of the *Vertebrae*. The *Os Coccyx* is altogether Cartilaginous, and undivided; Age divides it into three or four parts, which remain Cartilaginous til seven years be expired.

Os Coccyx.

The extremities of the *Ribs* that are ^d joyned to the Back, are altogether Cartilaginous, yet they soon grow hard: the *Sternum* of Infants, is at first Cartilaginous, and yet divided by no line, and yet the Superior are Sooner bony, then the inferior, and the middle parts of them before the extremities, whence it comes to pass that the bony part is compased about with a Cartilage one each side, and resembles so many bony Knots in a board.

*Ribs.
Sternum.*

So soon as the Child is born, the inferior part of the *Sternum* is Cartilaginous, and hath no division; then it grows bony, as I shewed you before; at last it is cut into six particulars, by a transverse line drawn from the Cartilages of the *Ribs*, to which you must number that which is by the Sword-like Cartilage.

Fallopins in his Observations, notes eight bones in the *Sternum* of Children; which afterwards are brought to seven, the two last being reduced into one: afterwards they are brought to fewer, six only appearing by that time the Child is seven years of Age; and though *Fallopins* think six alwaies remain, yet I have alwaies observed fewer.

Fallopins his Observations.

Fallopins

Fallopins thus describes the Union of the bones. After seven years the bones of the *Sternum* are joyned together and become fewer by degrees, so that six only appear, one bone being made of the fourth and fifth and another of the sixth and seventh. Besides this Union increasing, there are only four found, the third fourth fifth sixth and seventh growing together. Of the *Sternum* of Infants Read *Sylvius*, *com. ad ch. 2. Lib. Gal. de Ossibus*.

^a T. 8. f. 9. A B C. ^b f. 11. ^c f. 12. B. ^d f. 10. 11. A.

Chap. 29. Of the upper Limbs.

Scapula.

IN the *Omoplata* both *Apophyses*, and *Epiphyses*, are Cartilaginous, also the Neck with the Cartilage *Glenois* are of the same Nature. The eminence called *Coracoides* is an *Epiphysis*, yet the bone *Acromium* doth not seem seperated but it is an *Apophysis* incruited and terminated with much Cartilage, which is dried after three or four years, and changed into a bony *Epiphyses*. called *Acromium*, as it is, described by *Hypocrates* and *Galen*, at last that *Epiphysis* is turned into an *Apophysis*.

^a The appendices of the shoulders in each extremity are Cartilaginous, and grow hard by degrees. Also the *Trochlea* is Cartilaginous, but is sooner turned into bone then the superior parts: the superior part of the Cubit called *Olecramen*, is an *Epiphysis* and after one years time grows hard and is joyned to the bone.

Wrist.

The ^b bones of the Wrist when the Child is born: are composed of one Cartilage, afterward they grow bony and are distinguished from one another. But first they are spongy as the rest of the bones are, which from Cartilages become bones. The eight bone of the Wrist, turns bony last of al.

Metacarpus and Fingers.

The extremities of the ^c bones of the *Metacarpus* and Wrist are Cartilaginous, which are hardned within less then a year.

^a T. 8. f. 13. a b. ^b T. 8. f. 13. c. ^c f. 13. d.

Chap. 30. Of the Inferior Limbs.

Ilium.

THE *Ilium* in Children is composed, of three bones even til they are seven years of Age, to which the Ancients gave proper Names. ^a The first bone comprehends that widness which passeth to the midst of the Funnel, the other part is equally divided into two parts, a line being drawn by that Cleft of the Funnel Cros the Oval hole, and makes the Symphysis of the *Os Pubis*, the superior Part of this division is called ^b *Os Pubis*, the inferior ^c *Os Ischium*, the Lips of which are Cartilaginous.

Pubis. Ischium.

Thigh.

^a The Thigh on the superior part sends out three appendices; a Head, and two *Trochanter's* which remain Cartilaginous *Epiphyses*, a good time, the inferior part of the Thigh hath two knobs, the appendix is Cartilaginous.

Patella.

The Knee-pan at first is totally Cartilaginous; and is a long time ere it grow bony.

Tibia.

Fibula.

The bones of the *Tibia* and *Fibula*, differ nothing from those that are grown up save only in their appendices, both above and below, which are Cartilaginous, then grow hard, and remain seperated even to the tenth year and upwards.

Tarsus.

In the Foot al the bones of the ^c *Tarsus* are Cartilaginous for some months, the bone of the Heel excepted which is Bony within, though covered with Cartilages, without.

Sesamoides.

The *Sesamoides* remain Cartilaginous almost to consistent Age, two only excepted, which are in the first Joynt of the great Toe, for these grow bony presently after the Birth,

^a T. 8. f. 12. C C. ^b T. 8. f. 12. D D. ^c f. 12. E E. ^d f. 14. a. b. ^e f. 14. c.

CHAP.

Chap. 31. Of the Number of Bones.

I Ngrassias, Propounds a fourfold number of the bones of Infants, the first contains two hundred thirty seven. The second three hundred forty five. The third two hundred fifty nine. The fourth one hundred ninety two. But this last Number I doubt is, deviled, or else I do not understand what Ingrassias means.

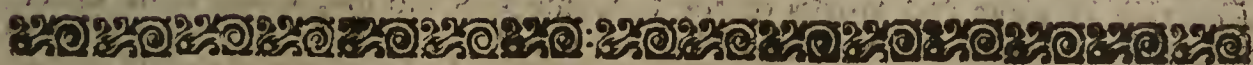
These Numbers he thus composeth.

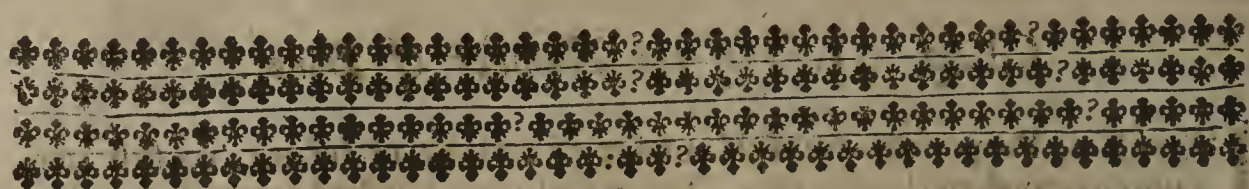
In such Children as are grown up are found three hundred five bones, in the Head seventy, to wit, eight in the Skull, twelve of the upper Jaw, one of the lower Jaw, six of the Ears, thirty two Teeth, eleven small bones of the *Os Hyois*, which all joyned together make seventy. The Trunk comprehends sixty seven, *Vertebrae* twenty four, *Scapulae* two, *Ingulae* two, *Sternum* three, *Ilium* two. These joyned together make sixty seven. But if the *Os Sacrum* consist of five and the *Coccyx* of three, (as often it doth) then there will be only sixty six. In both hands, eighty four, (adding the twenty four *Sesamoides*) in both Feet eighty four, the twenty four *Sesamoides* being also added, the total Number of bones will be three hundred and five; from this Number if you take away thirty two Teeth which doth not appear in Infants, the result is two hundred seventy three, although the Teeth being formed lie hid in the Gums, yet because there is no use of them, they are not reckoned amongst the bones.

In reckoning the second Number he proceeds thus, the *Vertebrae* of the Back-bone and *Os Sacrum* in Infants are divided into three Parts, the second excepted which is divided into four by reason of the Teeth, the *Ilium* is divided into three bones the *Sternum* into eight, the inferior Jaw of two, and the Frontal bone is double.

These diligently considered you should find amount to seventy two, which added to two hundred seventy three make three hundred forty five, from which if you take away the bones which deserve rather the Names of Cartilages than bones, as the bones of the Wrist sixteen, of the Instep eight, of the *Coccyx* four, *Sesamoides* forty eight; each Knee-pan and *Hyois* eight (the three small bones remaining) which are in number eighty six, there remains two hundred fifty nine. In these Numbers the three hundred fifty one Appendices are not Numbered which if you add to three hundred forty five, the Body of the Infant will be composed of six hundred seventy Bones.

The End of the First Book:





THE
SECOND BOOK
OF
ANATOMY
AND
PHYSICK,
OF
John Riolanus.

Chap. I. *General Precepts, which he that would be an Anatomist, must be first Acquainted with.*

Being that according to *Aristotle Chap. I. Lib. I. post. Analyt.* Every Doctrine and discipline which consists in reason and intelligence, is perfected by fore-knowledg, and *Tullius Lib. I. de nat. Deorum*, saith that without fore-knowledg, neither any thing can be understood nor studyed, nor disput- ed. Before I set about my Anatomical work I thought good to premise certain general Precepts, which are the foundations of Anatomy, and wil give great light to our proceeding.

How Anato- mists Consider the Body of Man. The Body of man is considered by Anatomists as composed of many Parts, which they examine Limb by Limb, and by a diligent Dissection, they divide the whol Body, into its smallest Parts. They divide it first into three grand Parts, Containing, Contained, and Impelling; that is into the Parts, hu- mors, and Spirits. But in the Anatomical dissection of a dead Body, the Humors and Spirits, are not considered, the Speculation of which belongs to Phy- siology, only the Sollid Parts are regarded, which are either such as make, or such as contain Humors and Spirits or the instruments of Motion, which is the Chief Action of a living Creature, for which it was made. The sollid Parts are similar or dissimilar. They are called similar Parts because they are most simple, from which, as from a principle, the dissimilar Parts are composed. The similar Parts according to Anatomists are Bones, Cartilages, Ligaments, Membranes, *Fibres*, *Veins*, *Arteries*, *Nerves*, *Flesh*, *Fat*. These are found almost in al Compound and dissimilar Parts, and the Corpulency of the Parts is formed of them. The Hairs, and Naills are excrements of the external Parts: Therefore an Anatomist ought to be

be well instructed what these similar Parts are, that when he searcheth out the structure of the organical parts, Limb by Limb, he may know the Fundamentals of this structure.

1. A bone is a part of the Body, most cold and dry, Terrestrial; and therefore hardest, that so it may prop up the other parts of the body. 1. *A Bone.*
2. A Cartilage, or Gristle, is not so hard as a bone, which in Old Men sometimes degenerates into a bone: The Cartilages are placed about the extremities of the bone, to ease them in their Motion; some are found separated from the bones, as the Cartilages of the inferior Jaw, in the Articulation of the *Clavicula*, in the *Sternum*, in the Articulation of the *Tibia* to the Thigh; besides the Cartilages of the *Larinx*, Wind-pipe, and such as are placed to prop up other soft Parts, as the Nostrels, and Ears. 2. *A Cartilage.*
3. A Ligament, or bond, is a part which binds the bones together, being of a middle substance, between a Cartilage, and a Membrane; softer than a Cartilage, harder than a Membrane. 3. *Ligament.*
4. A Membrane, Skin, or Coat, is very soft, and subject to dilation. It is the covering of other parts, or the Receptacle of something; as the Stomach, Bladder of *Gal*: It being a hollow body, it receiving something, it may be called *Tunica*, a Coat; If it Embrace and cover a solid body, it is properly called *Membrana*. 4. *Membrane.*
5. A *Fibra* is like a thread stretched over a Membrane, or Interwoven therewith, to strengthen it: and because of its various Situation, it is called *Right*, *Oblique*, and *Transverse*; not only to help the Membrane, but also to strengthen it. Every sort of *Fibres*, is thought to perform a several action; as the *Right*, to draw to; the *Transverse*, to retain; and the *Oblique*, to expel. Which Motions notwithstanding, absolutely depend upon the inbred faculty of the Part; which as it hath a violent dilation, so hath it a willing, and Natural contraction, and is helped in these by the *Fibres*. 5. *Fibra.*
6. A *vein*, is a Membranous Vessel, round and hollow, allotted to contain Blood, and distribute it for the Nourishment of the whole Body. 6. *A Vein.*
7. An *Artery* is a Membranous Channel of the same Nature, but something harder, and thicker; ordained for the containing and Distributing of the Arterious blood: The original of both which, *Aristotle* thought was from the heart; but wiser Physicians, hold the beginning of the Veins to be in the liver; but of the Arteries in the heart. 7. *Artery.*
8. A *Nerve* is a Channel made to carry animal Spirit; and because this spirit is most subtil, therefore the Cavity is so small, that it is not discernable. 8. *Nerve.*
9. The *Flesh* is the foundation of organical, and dissimilary Parts, where bone is wanting, and makes up the chief Part of our bulk. The flesh is in substance, soft and thick; made of blood alone, compacted together, and well concocted, if it be red; but of blood, and Seed, if it be white. 9. *Flesh.*
A four-fold sort of flesh, is observed in the Parts; *Viscerous*, and *Musculous*, both of them very red; *Membranous*, and *Glandulous*, both of them white. For every substance of the bowels is called *Flesh*, or *Parenchyma*. The thicker substance of certain Membranes, which are the containers of something, which by dilating and contracting their bodies, they attract, retain, and expel, are also called *Flesh*, or a *Flesh-like* substance. The thick, and spongy substance of the *Glandula*, is called *Flesh*; but especially the substance of the Muscles deserves the Name of *Flesh*.
10. The Fat although it appear not till the whole body be formed, and when the Child is big, and grows to the Parts; yet because in the composition of organical Parts, it often concurs to make up the bulk, it is Numbered amongst the similar Parts. Fat is the thinnest substance of blood, Fat, and Oyly, sweating out through the tender Coats of the Veins, and hardning between the Membranes: It is two-fold, according to *Aristotle*; Soft, and external; Hard and internal. The one is Grease, The other Suet. 10. *Fat.*

These three similar Parts; *Bones, Cartilages, and Ligaments*, shal be treated of, as they are shewed in a Carcass, from top to Toe, after we have shewed the Muscles; because they are so joyned together, that one cannot be shewed without another.

But I desire al such as are studious in Physick, first to be wel acquainted in the Osteology or History of the dry bones in the Skeleton of a Man, before they come to the inspection of a Carcass; for so they wil the better understand the whol anatomical discourse of the dissection, and find out the reason of my other Osteology in the bones of Carcasses.

The Rest of the similar Parts shal be shewed severally in the explication of the dissimilar Parts, seeing of the similiary Parts aforesaid, viz. *Bones, Cartilages, Ligaments, Membranes, Fibres, Veins, Arteries, Nerves, Flesh and Fat*, the Bulk, or Material substance of the dissimilar Parts, is made up, and therefore you shal hear similiary Parts often mentioned, in the explication of them; howbeit, in some places they exist apart, no waies joined, or united unto others, to constitute an Organ; but are considered with reference to their Particular uses.

*Organical
Parts, what?*

But they concur together, and are united one with another, in organical Parts, that they may perform their various Offices: for the effect of which, they are divided into four orders: For in every Organ there is the principal Part by which the Action is performed: Another, without which the Action cannot be done: A third, by which the action is preserved. But in every Organ, the principal Part ought to be similar and proper to it, such as is not found in another Organ. But this similar Part cannot perform its action alone, unless it be helped by others; and therefore the concurrence and Union of similiary Parts is necessary. Wherefore, every Movable action, belongs truly, and poperly to an Organical Part; and none unless it be alteration, belongs to a similiar Part; which out of the composition of the Organical, hath only use, which notwithstanding, it contributes to perfect the action of the Organical.

[How many.]

More over, organical Parts according to the dignity of their action, are divided into *Principal*, and *Administring*. They are called principal, which supply the whol body with matter and faculty: Physitians hold them to be three; the *Liver, Heart, and Brain*: Aristotle held but one principal Part of the body, viz. The Heart, which is King and Ruler of al others. The rest of the Parts Minister, and are subservient to the principal. According to the various composition of the Organical they are divided into compound, more compound, and most compound: For the Finger is compound; the Hand, or Foot, more compound; the Limbs, are most compound.

*what is to be
observed in
each Part.*

But that we may seek out the structure of each Part exactly; we must observe the *Name, Substance, Temperature, Original, Scituation, Quantity, Number, Figure, Color, Connexion, Communion, Action, and Use*. Connection differs from communion; for Connexion is the sticking of one Part to anther, of one or more Parts by which they depend; it is sometimes taken for the Original of the part it self, and yet the Original of some Parts is distinguished from Connexion: But communion is either universal, with Parts remote and neer, which is done by Veins, Arteries, and Nerves, by intervening of which, al the Parts have community with one another; or Particular, when some Particular Part communitates its self to some neer, or remote Parts, and so the Gal communicates it self by the Biliar passages to the Liver, and the Gut *Duodenum*: The Reins, and Bladder have communion by the *Ureters*. In this Method you may comprehend whatsoever may be spoken, or demanded of any Part. But in the History of Parts we must begin first of al with those things that are common to the whol Organ, then with those things which are Proper to the same Organ: but in describing the Fabrick of the body of Man, we wil follow the common order of Dissection.

Chap. 2. *Of the Natural and Legitimate Conformation of the Body.*

Seeing my design and intent of handling Anatomy, doth not consist in a bare and simple contemplation of the Parts of the Body, but is also referred to the use of Medicine; before we come to the dissection of the body of man, we will describe in a few words the Legitimate and natural conformation of the Body of Man when it is alive, which is the basis whereby we judge of the Sickneses and imperfections of Men or Women: this was necessary of Old in buying of Servants, in joynning Men and Women in Marriage that they might have Children, and in chusing select Men for Soldiers. And this knowledg is necessary even to this day; for in some Monasteries such as desire to lead a Religious life, the Physitian views them Naked from the Crown of the Head, to the Sole of the foot; and notes their respiration, and pulse, and voice in singing. This is done in buying Slaves in divers Countries, and also in buying Horses; and also Nurles are exactly viewed by Physitians for the education of Children, I mean the Children of Princes.

Therefore in Man-kind, you may consider the difference of Sex: Substance of Body, Temperature, Greatness, Color, form, or Figure; as they are convenient in a perfect and well formed body, that so by this, the difference of a body not well formed may be known.

As for that which belongs to Sex, Man-kind is twofold: Male and Female. The Latin word *Homo* comprehends both: and a Women has been called *Vira*, and therefore a stout Women is called *Virago*: the differences of both I have Accurately expounded in my *Anthropographia*. Lib. 2.

The substance of the Body in Man ought to be fleshy not Fat; firm and solid, not soft: the Limbs meanly hairy, for smoothness in Men, such as is in Women, argues effeminate conditions.

A healthful temper ought to be hot and moist, because life consists in, and is preserved by such a temper, yet is there a peculiar temper in every person, which by Physitians is called *Idiosyncrasia*; which if *Galen* could exactly have known, he would have thought himself equal with *Æsculapius*: but we must reduce this to the General. But by what signs this may be known, *Galen* hath declared in his little book of *Art of Physick*, and other Authors.

The Magnitude of the body is threefold, according to the threefold Dimension of the body. We shall consider chiefly the Longitude and Latitude: The natural and decent Longitude of the body ought to be four Cubits, the Latitude one Cubit as *Goropius Becanus* teacheth: this also is confirmed by *Vitruvius* who defined the just Longitude of the body of man to be six Roman Feet. And *Agellius* Lib. 3. ex *Varrone*, Noted that the highest pitch of a Mans height was seven Foot: but more Men are shorter, than taller than this. *Vegetius* Writes that Soldiers ought to be chosen six Foot high, yet by Reason of difference of sex, Region, and Diseases, Men are either taller or shorter, for each soyl hath its Particular Nature: so the people of *Asia* are taller than those of *Europe*, and in *Europe*, those of the North parts, as *Denmark*, the Low-Countries and those of upper *Germany* are tallest.

The various Mensuration of bodies *Hippocrates* hath described Lib. de aer. aq. et loc. Commonly men are taller then Women; whereas in some other living creatures, Females are greatest.

The Latitude or thickness in a well Proportioned body ought to be, almost half the Longitude, so that if the Longitude be six Foot, the Latitude ought to be almost three: slenderness of body is subject to Consumptions, neither can the body be strong and fit for labor unless it be thick.

In the bigness of the body is Magnanimity and beauty, quoth *Aristotle*, *Ethic*. Lib. 4. For a man of a little and small body cannot be fair; yet if you regard, understanding,

The necessity of it.

Considerations in a Man well formed.

1. Sex.

2. Substance.

3. Temper.

4. Magnitude.

understanding, there is little Wit commonly in those Tal bodies.

Elegantly said *Celsus*, Lib. 2. Ch. 1. The best disposed body is well set, neither slender nor Fat, a tall stature is comely in youth but not so in Age, a slender body is weak, a Fat body dull.

5.
Color.

The Color of the body is diligently to be marked, for such a Color as flourisheth in the Skin and countenance, the same is predominant in the Humors, and therefore sanguine people are Red, Chollerick Yellow, Melancholly Black or brown and dusky, Flegmatick are pale: a brown and ruddy Color are preferred before pale, which argues softness of body.

There is some difference in Authors about the Color to be Chosen in a Nurse, *Aristotle* prefers brown, others a Mingled Color of Red and white.

6.
Form.
of the Head.

Now the Natural and Legitimate form of the Head, Breast, Belly, and Limbs, is to be considered. The Head ought to be round, and not Copped, unless the Neck be very thick: a great Head is preferred before a little one: from the Head ought the Nature of the Nerves, Veins, Flesh, and Humors to be collected.

A great Head requires a great Neck, which gives indication of a great breast, by reason of the Parts contained in the Neck: a great breast makes a large belly, and therefore the proportion of the rest of the Cavities depends upon the Head.

Breast.

The Chest ought to be large, of an Oval Figure, and the Back-bone straight, the breast ought to be somewhat convex, not sharp, nor flat, nor depressed.

The Papps of Men, ought to be depressed, but in Women swelling round, and Glandulous, rather than Fatty, or Flethy, because they are the Emunctories of the breast if the Woman give not Suck. If the Duggs be small the Women are sickly, and if the Nipples look pale the Womb is Diseased, according to *Hippocrates*.

What Breasts
are to be chosen
in Nurses.

Whether are large breasts to be chosen in Nurses, or such as are mean in bigness? Great breasts please not *Moschio*, because they are Fat, neither have they plenty of Milk; and therefore Fat Nurses are not to be preferred before such as are Lean, and Juicy; neither such as are tall, before such as are of a mean Stature: *Aristotle* Lib. 3. de hist. animal.

Belly.

White colored Women, because they are Flegmatick, have but bad Milk: From the breast, we pass to the belly, which ought to be round and sticking out: Women that have such bellies, the Poets praise, and say *Venus* had such a one. *Hipp.* Lib. de vet Med. Notes that long and round bellies, ought to be considered of Physicians, because by looking upon them, 'tis easie to know which are fit for strong Purgations; for such whose Parts in the *Abdomen* are strong, and well disposed, may easily Purge; but such as are slender, take strong Medicines with danger.

Very Fat Women are hard to conceive with Child, *Hippoc.* Aph. 4. Lib. 5.

Privities.

As for what belongs to the Privities; *Helio-gabalus* chose such for Soldiers as had large Privities, because he thought they were lusty, stout Men. A very long yard is not fit for Venerie, either because the strength of the Seed passeth out, by reason of the length of the Yard, if you will believe *Galen*; or because the Muscles are tyred, by erecting a great, and long Yard. A mean Yard is most fruitful, and gives most & longest pleasure in the act of Copulation. A long Yard, though indeed it fill the Neck of the Womb, yet it makes it not so fruitful; and is hurtful to such Women as are subject to the fits of the Mother; by stretching the Genitals: Neither are the Testicles when they are great and Pendulous, to be commended.

Limbs.

We pass to the Limbs, viz. The Hands and Feet, which ought to be equal in proportion to the rest of the Body: The Longitude of the Foot, from the *Os Pubis*, to the extremity of the Heel, ought to be equal to that of the Hand, from the *Ala*, to the top of the middle Finger. If the whole body be six Foot long, the Foot is three: both Hands and Feet, are somewhat fleshy in strong bodies; for although slenderness of Legs be commended in Horses, 'tis not so in Men.

An example of a perfect and absolute body well formed, is to be Read in *Sidonius Apollinaris*,

Apollinaris, Lib. 1. Epist. 2. de Theodorico rege, wherein is one remarkable fault to be amended, not Noted by interpreters, for Excrementa read Extrema. Inter Extrema Costarum spina discriminat.

Chap. 3. *The Division of Mans Body.*

BEfore we expose the whol Body of Man, to Anatomical dissection, it ought to be divided into its Parts, or principal regions, that the Number and order of the regions, and where they begin, may be known.

Amongst the various divisions of the Body of Man, this in my mind seems the best, and to be preferred before the rest.

Division of the Body.

The body is divided into the Trunk, and the Limbs.

The Trunk is divided into three Principal Regions; the Head, Breast, and Belly.

The Head obtains the Superior place; The Breast, the middle: and the Belly, the lowermost.

The Members or Limbs are four branches sticking out from the Body, two Arms, and two Legs.

What are the bands of these Regions, I shal shew, when I come to speak of each Region apart.

The Medicinal Consideration.

I wil not stand here in rehearsing & designing the external Parts of the whol body, which are expounded in every Region of the same; but only consider the corporeity, or fleshy habit, which is covered with the Skin, like a Garment; which though it look for the most part beautifully without, it looks ill favoredly within. This habit of the whol body, makes the third Region of the body, to which the Humors come from the deepest Parts; the ill effects of which, are cleerly seen in the Diseases, and Symptomes which appear outwardly. The juyce which is seen in the leaf and branch comes from the Root.

I shal reckon up the cheife Diseases, which use to infest the outward habit of the body. *Viz.* Immoderate Fatness, or Leanness, Defluxions, Gouts, Dropsy, Cachexia, the whores Pocks, Plenty, or defect of Sweat, by reason of the openness, or closeness of the pores, Palsie, Convulsion, Unquietness, and weariness and al kind of swellings.

The Flesh of man, because its Nourished by purer Blood, is delicater, than the flesh of other Creatures, and preferred before it by Canibals, or Man-Eaters.

Flesh, seeing it is Porous and Musculous, it hath empty spaces, which in men in health are filled with spirit and blood, but in such as are sick, with Water and wind; thence come Defluxions over the whol body, and other Diseases of the Skin.

The Habit of the whol body, is Purged and emptyed by sweating, by Cupping-Glasses, Scarrification, and Rubbing, according to the Doctrine of *Galen, Lib. de Sanitate*; by Bathings, Whippings, and Beatings, and blistering, and Rubifying, or Pimple-raising Applications.

Therefore seeing the smal Pocks and Measles, are but the scum of the whol habit of body, that is, of the Flesh, and solid parts, their coming out is to be furthered, either at the beginning, or at any other time, with Sweating Medicaments, and such things as draw to the external Parts. Neither need you let blood so often, though the Patient be strong, twice if need be, is enough, because it hinders the Motion of Nature in expelling, unless either a dead sleep, or strangling with a Feaver, or bloody Flux, which is for the most part deadly, draw us to that remedy; not neglecting young Pidgeons Cut alive through the middle, laid to the Hands and Feet, and sometimes to the Heart, and smal Cupping-Glasses, fastned al about the body, with

with light Scarification. And sometimes bathing the Body in Luke warm Water profits, if the season of the year be convenient, to make the Measles and small Packs come out the better.

Chap. 4. Of the lower Ventricle.

why the Dissection begins at the lower Ventricle.

THE Dissection and Anatomical demonstration, must be begun at the belly, because it is the sink and Kitchen of the body: and therefore soonest Putrifies and stinks.

It is called in Greek *Coilia* because it is coile that is hollow; in latin *Venter*, in English the *Belly*.

Its Substance. Its substance is fleshy composed of various similar parts, which we shal propound in order hereafter.

Temperature. The belly seeing it is a most compound part, its own temperature is none at al, but it follows the temperament of the parts contained in it, and especially of the Liver.

Original. It hath its Original from the first conformation with the rest of the Parts.

It is Scituated in the inferior part of the Trunk of the Body.

Scituation.
Quantity.

Its Quantity or widnels is from the bastard Ribs, or *Diaphragma* to the Os *Pubis* or share Bone; and with these bounds it is Circumscribed above and below.

The whol widnels of the belly is distinguished into three Regions; the superior called *a Stomachal*, the middle called *b Umbiliar*, and the lower called *c Hypogastrica*.

Again in every part, both the lateral and middle parts ought to be observed; the lateral parts of the stomachal Region are called *d Hypochondria*, of the middle Region *e Iliac*. The middle is called the *f Navil* which is the centre both of the belly and of the whol body.

The lateral parts of the Hypogastrick Region are called *g Groyns*, the middle *h Pubis*, the share which after the fourteenth year both in men and Women is adorned with Hair, as a natural covering for thole parts, which the common Law of bashfulness commands us to conceal.

In respect of number, the belly is but one; yet by the *Peritoneum* it is divided into to Cavities; The greater holds the parts which prepare for nourishment. The lesser holds the bladder, and Genitals in men; and the Womb also in Women which never bear Children.

Parts containing.

Common.

It is divided into parts containing, and contained. Parts containing, are proper, common, and diverse: common are five; *i Cuticula*, or scarf Skin; *k the Skin*, *l the Fatty Membrane*, *m the Fleshy Membrane*, and the *Common Membrane of the Muscles*.

Proper.

Diverse.

Proper are, the Muscles of the *n Abdomen*, and the *o Peritoneum*.

Diverse are, partly Fleshy, partly bony: bony are the *p Vertebrae*, and *q Pelvis*, which are parts of the Os *Sacrum*, and *Ilium*. Fleshy are, the Muscles *r Psoas*, *s Sacrolumbus*, *t Latissimus*, *u Sacer*, *x Semispinatus*, *y Quadratus*. I cal them diverse, because thole bones and Muscles, being Scituated in the hinder part of the belly, do make somthing toward the constituting of the belly, though they are referred to another part, and pertain to another use.

Contained Parts.

Figure.

The parts contained, are manifold; which are divided into such as nourish, and such as engender; such as nourish are such as make Chyle, and such as make blood.

The Genitals are of men, and of Women. The Figure of the belly, is Oval, by reason of the parts contained; which if removed, it is hollow, that it may be the seat of the Vessels dedicated to nourishment, and Generation; and therefore the latins cal it *Abdomen*, and the Greeks *Epigastrion*.

Color.

The color of the superficies of the belly, is like the color of the rest of the body; in men of ripe Age it is Hairy from the *Pubis*, up to the Navil.

Connexion.

It is outwardly knit to the breast, and inferior limbs by the Skin; inwardly by the *Peritoneum*. It

It communicats with the principal parts, by *Veins Arteries*, and *Nerves*.

The use of the Belly is, to comprehend, and involve the parts of nourishment, and generation; take it individually, it consists of Musculous Flesh.

Use.

It hath action to compress the parts contained within its self, for the expulstion of excrements, upwards and downwards; and to force the Child out of the Womb.

Action.

^a T. 1. f. 1. A. B. ^b f. 1. C. C. ^c f. 1. E. E. ^d T. 1. f. 1. A. B. ^e f. 1. D. D. ^f infra. C. C. ^g f. 1. F. F. ^h f. 1. g. f. 2. D. D. ⁱ f. 2. B. B. ^k f. 2. C. C. ^l f. 2. D. D. ^m T. 2. f. 8. 9. ⁿ T. 2. f. 3. and 4. ^o T. 10. f. 10. O. O. ^p T. 23. f. 1. A. ^q T. 14. f. 2. L. L. f. 3. B. B. ^r T. 14. f. 1. C. C. D. D. ^s f. 4. B. B. ^t f. 3. D. D. f. 4. A. A. ^v f. 2. O. O. ^x f. 4. C. C. ^y T. 10. f. 1. N. N.

The Medicinal Consideration.

From this discourse, a Physitian collects many things, in his Practice, useful:
1. That the Belly is the Sink of the Body, in which the vices of our intemperance reside; the Mother of all mischeifs, and the Nurse of Physitians; in which condition 'tis called *Collatibus Venter*, an Aldermans Belly.

He whose Belly grows to a great bigness, is called *Ventrosus*, Fat Guts. Some we read of, whose Bellies grew to a monstrous bigness, as *Nichomachus Smyrnaeus*, in *Galen*; in *Athenaus*, Lib. 12. *Deipnosophist*, we read of a King that was choked with fatness. But famous is that History in *Michael Neander*, in *Erot. Hebr. ex. Talmud. in Jona. Rabbi. Ismael*, and *Rabbi Eliazer*, had such great Bellies, that when they stood with their Faces together and their Bellies touched, two great Oxen might pass between them, and touch neither of them.

By reason of the Fleshy, and fatty substance of the Belly, it is subject to diverse swellings, Especially *Aposthemes*, either from the liver by the *Vmbilicar Vein*; or else the matter is sent from the Suppuration of the Reins; which being shut up in the Doublings of the *Peritoneum*, may send their impurities into the external parts of the Belly.

Swelling in the Abdomen.

This fleshy and fatty substance, ought to be mean; if it be greater, 'tis a discomdity to life, if lesser it shews an ill Disposition of the Bowels: Therefore *Hippocrates* wrote, that in every Disease, the parts belonging to the Belly, had better be somewhat gross, then to slender; for if they consume, 'tis very evil: therefore Physitians were wont to handle the whol belly, especially the *Hypochondria*, which ought to be soft, equal, and fleshy.

Its Constitution what it should be.

The Scituation of the Parts in the Belly.

The largeness of the Belly is considered, according to longitude and depth, that so the Physitian may know in pains and wounds in the belly, which part is afflicted, or wounded.

The Scituation of the Parts in the lower Ventricle.

According to depth, the parts are divided into upper, and lower; and therefore according to *Hippocrates* the pains in the upper part, are more light; those in the lower, more strong and dangerous.

According to Longitude by the division of the places, you may understand by the bare looking upon them, or feeling them with the hand, what parts are afflicted, pained, or wounded. In the right *Hypochondria* is the liver, which passeth even to the Cartilage *Xyphois*; It passeth a fingers breadth beyond the bastard Ribs, on the sides forewards, two fingers. In the middle region, is the Stomach placed, which inclineth more to the left *Hypochondrium*, and descends four fingers breadth below the bastard Ribs.

Viz.

Liver.
Stomach.

In the left *Hypochondria*, lies the Spleen, which Naturally hangs under the bastard Ribs, the breadth of a mans Thumb.

Spleen.

The umbilicar Region, the Navel possesseth; above which, is the Gut called *Colon*, transversly seated; and in the whol compass of that Region, is the Gut called *Jejunum*, disposed: Toward the Back-bone, are the Kidneies. The beginning of the *Colon* being bowed back from the right Kidney; under the Liver and

Colon.

Jejunum.

Stomach,

- Kidneys.* Stomach, to the Spleen; afterwards passeth obliquely to the left Kidney: and therefore the pains of the Colick, must diligently be distinguished from those of the stone.
- Ilium.* In the middle, and side-Region of the Hypogastrick, in the Gut called *Ilium* contained; In the bottom of the belly, the bladder, under which lies the right Gut.
- Bladder.*
- Right Gut.*
- VVomb.* In Women, the Womb lies between the bladder, and the right Gut: under the Guts, lies the *Mesenterium*, as the Sweat-bread doth under the Stomach. A little below the Navel, the *Omentum* is stretched about all the Guts, and divides all the internal parts with the *Peritonæum*, from the external; those that lie deep, from those that lie at top.

The Medicinal Consideration.

- Diseases of the Abdomen.* In the Belly, are frequently all sorts of Tumors, Impostumes, Rumblings of the Guts, and Croaking; which proceed either from Tumors of the Parts contained, or from wind, or collection of Water.
- It is Cut on the sides towards the *Hypogastrium*, in the *Cæsarian* dissection, to draw out the Child in a difficult labor. It is pricked near the *Os Pubis*, to draw out Urine, when a *Catheter* cannot be put in. It is pierced in the bottom of the *Hypogastrium*, near the Navel, to draw out Water in the Dropsie *Ascites*, which Operation is called *Paracentesis*.

Chap. 5. Of the Scarfe Skin.

- A**mongst the parts which make the *Abdomen*, the first that comes to view, the Greeks call *Epidermis*, the Latins *Cuticula* and we the Scarf-Skin.
- Substance.* Although, by its substance it seems to be Spermatical yet it differs much from it.
- Original.* It's Temperature is none at all, and therefore no more words about it, but for its original, it is framed of the Excrementitious and Viscous Vapors of the Skin, which Sweating, out grow dry by the coldness of the Air, and like a thin Skin, compasseth the Skin round, and therefore it sticks to the Skin firmly and universally, and hath no other bounds then the Skin hath.
- And although to the sight its substance appears simple, yet *Fabricius ab Aqua pendente* will have it double, one which is inseparably fixed to the pores of the Skin, the other separable, without any offence to the Skin it self, but the thickness of the *Cuticula*, be it more or less, doth not encrease it's number, for though in some places it may be divided into many small Skins, yet in no place can one be pulled off without another.
- Figure.* It hath no Proper figure besides what it borrows from the Skin it self, from which it differs in this, that it is no way porous.
- Color.* It is thought to partake always of the same color with the Skin, and yet in Black Mores this being pulled off, the Skin it self is white.
- Connexion.* It sticks firmly to the true Skin, and is an Excrementitious part as the Hairs are, and hath no communion with the principal parts, by Veins, Arteries, nor Nerves, because it wants them, and is insensible, as you may find, if you please to scrape it off from your hands, or any parts, or thrust a Pin or Needle under it.
- Use.* It hath no action, only use, which is to shut the pores of the Skin, to make it smooth, and beautiful, polished and even.

The Medicinal Consideration.

By these things thus considered, a Physician may see that the scarfe Skin hath also its Diseases, though *Hippocrates* thought them to be only deformities, He makes a distinction

a distinction whether they may be called Impostumes or diseases; at the end of Lib. 2. *Prorrheticorum*, because such as belong to the Scarfe-skin, pertain most of all to the dignotion and Cure of Affects.

It is infected with divers Spots, both natural, and sickly; natural, are those many deformities of the Skin; Sickly, are the Meazles, small Pocks, purple spots in Feavers, or any Spots of other Color; sometimes without a Feaver, when Nature sends any Wheyish substance of another Color into the Scarf-Skin.

Diseased spots of the Scarf-Skin may, and ought to be cured: but such as are Original from the birth, are very difficultly taken away, because they stick firmly to the Skin, as well as to the Scarf-Skin.

This Scarf-Skin may be beautified; which *Galen* denies to be done, by an honest, and honorable Physician; but allows it to be done, by Court Physicians, and Bauds, and Chamber-Maids that wait upon their Ladies. In Women, the *Cuticula* is thick, smooth, and many time stops the pores of the Skin, and hinders free perspiration. In men it's usually full of pores, that so the Hairs may pass out. It may be beautified.

Lastly, as the Scarf-Skin of the Body, being well looked after, and adorned, procures beauty and comeliness to the Body; so being made rough with Spots, or burnt by the Sun, it unhandsoms a man. It is ridiculous to draw it off with blisters, that so it may come again the clearer, you loose your labor as much as though you washed a black-more.

The Scarf-Skin peels off in divers persons whilst it is dried or burnt, and the Skin it self in Leprosies, and diversie that have the french pocks; The Skin it self comes off by fleakes in such as are Leprous, and in some that are troubled with the Whore-masters Pox.

Chap. 6. Of the Skin.

AFTER the Scarf-Skin, follows the Skin called in Greek *Derma*; it hath a substance diverse from other Membranes, the like of which you shall never find in the whole Body, because it consists of Seed and Blood mixed together; yet so as that portion of Seed is predominant, which may be bowed, and distended: from which the Skin is accounted *Spermatical*.

Its temperature is cold and dry, or more properly, exquisitely temperate, yet so it may be the Judge of feeling.

It is extended over the whole body, and on wraps it like a garment, and therefore its dimension is as the dimension of the Body is.

Although it seem but one, both to sight and touching, yet some hold it to consist of two Skins; but I could never find them to be seperable; only it may be cut into many parts by reason of its thickness.

It hath the same Figure which the body hath, that it cloatheth. Its texture is Slight, and very full of small holes, for insensible transpiration, and the passing out of excrements: and in diverse places, it hath visible great holes; as in the eares, Eyes, Nose, mouth, fundament, and privities of Men and Women.

It takes its Color from the predominant humor; for of what color the Humor predominant in the Body is, of that color is the Skin, unless it be such from their birth, as in *Ethiopia*.

It is straightly knit to the Parts under it, and therefore immovable, excepting the Skin of the Forehead.

It hath communion with the principal Parts, by innumerable veins, Arteries; and Nerves; the extremities of which, it takes on every side, for it hath neither of them all three peculiar to its self.

Whether by reason of its feeling, it perform action, a man may make a doubt; for otherwise the membranes, which are the instruments of inward feeling, perform action also; but what Author ever said that the Membranes performed action?

Its Names.

Substance.

Temperature.

Number.

Figure.

Color.

Connexion.

Communion.

Action.

use. We grant that it hath an excellent, and particular use, to defend and adorn the body, to receive the excrements of the third concoction to cleanse the Body of filthy fuliginous Vapors, and Sweat.

The Medicinal Consideration.

Affects in Let us now reduce this same conformation of the Skin, to a Physical use. Its
Substance. substance against Nature, consists in its over thickness.
Temper. Its temperature is changed in diverse diseases.
Number. It's number is viciated, when the *Cuticula* is viciated, or gnawed through; or the Skin it self lost.
Figure. Often times its smoothness, is turned into roughness; or it is disfigured by pustles.
Connexion. Sometimes its passages are stopped, or more open then they should be.
use. Its connexion, is marred in wounds, and Ulcers.
 Sometimes it's use is hurt, when it is insensible; or when it receives not only the excrements of the third concoction, but also of the whole Body.

Therefore the Skin, seeing it is the breathing place of the whole body, is subject to an infinite number of Diseases; and if the pores be shut, the Body suffers great inconveniences, by reason transpiration is hindered; for the Body ought to ease it self that way, according to *Hippocrates*, *Lib. de Alimento*: The motion of the Body, to perspiration, the wider it is, the healthfuller are men; the less perspiration men have, the more sickly are they; they which have quick perspiration, are weaker, though better in health, and soonest recover when they are sick: such whose perspiration is bad, are strongest before they are sick; but when they are sick, their Cure is most difficult.

Diseases proceeding from disorder of the Skin, are more dangerous in winter; and in malignant Fevers, by reason of the interception of the transpiration, the Native heat is choaked. Breathing a Vein is a remedy for such.

From the substance, and Color of the Skin, *Hippocrates* propounded two prognosticks: *Lib. 5 Aph. 71.* and *Lib. præn. Part. 7. and 8.*

Of the spots of the Skin, read *Soranus*, Chap. 38.

The Skin is like in Color, to the predominate humors, in the Body *Hippoc. de humoribus.*

Of divination by the Moles of the Skin, wrote *Polemon*, a Greek Author; and amongst modern writers, *Ludovicus Septalius, Mediolanensis*, Wrote most accurately.

Aristotle concluded the subtilty of a persons wit, from the subtilty and thinness of the Skin, rather than of the blood.

The thinness of the Skin, is the cause why man alone is troubled with the Leprosie, according to *Aristotle*, *Prol. 5. Sect. 10.*

It is certain that contagious Diseases, may be drawn in through the pores of the Skin.

whether Skin The Skin grows hard and dry, through burning Fevers, and sometimes it be-
lost, can be re- comes as thick as an Elephants Hide: especially about the Back, Limbs, and
gained. Thighs, as I have seen it in many, like a tanned Hide. The Skin lost, grows not again, but degenerates into a Scare: For it is made by the first intention of Nature, but repaired by the second.

Chap. 7. Of the Fatty Membrane.

Its Names. The Greeks call it *Stear*, and *Pimele*; it makes a common membrane, by reason of its consistence: in Brutes it is called *Arvina*; and why not so then in men?

Substance. Its substance, although it be something solid, yet is it soft, and Oily, as you may perceive

perceive if you handle it with your Fingers, or lay it by the Fire.

It arifeth from the thinner portion of the Blood, diffilling through the Veins like dew, and congealing about the Flefh: this is the certain matter of the Fat; of the efficient caufe only is the queftion made, Namely, Whether it obtaine its confiftence by heat, or cold. Al acknowledg a moderate heat about the membranes; compelling, and applying this fame fatty, and Oyly Liquor.

Original.

The Temperature then of the Fat, is moderately hot and moift.

Temper.

It is contained under the Skin, univerfally over the whol body; the Forehead; Cods, and yard, (where there is no Fat) excepted.

Situation.

Therefore the Fatty membrane, is large, as the Skin is.

In Number it is only one, unlefs you connex the Flefhy membrane, internexed with it, as *Sylvius* doth.

Number.

It hath no Proper Figure.

Figure.

In Color it is white; if at any time it be red, it is becaufe blood, by reafon of fome Laceration, is mixed with it.

Color.

It sticks firmly to the Skin, neither can it be divided from it without scraping; and fo it doth to the Flefhy Membrane.

The Fat cannot communicate with the principal Parts, becaufe it is not truly nourifhed; nor yet lives, unlefs by appofition as ftones do; neither yet is it fenfible: therefore it wants both Veins, Arteries, and Nerves; and yet al three of them pafs through the Fat, that fo they may come at the Skin.

As for the ufe of it; it warms the body in Winter like a Garment, and cools it in Summer, by hindring the penetrating of the heat: It is like a Cushion for men to fit on, and in long fafting, it is turned to Nourifhment of the Flefhy Parts neer to it, which Suck out its juyce.

ufe.

Chap. 8. *Of the Flefhy Membrane.*

THe Flefhy Membrane lies under the Fat, and sticks to it, and is conspicuous in young Children newly born, where it is not hid with Fat. It is more obfcure in fuch as are grown up, and yet it retains it Flefhy fubftance, as is evident about the Loynes, Cods, Forehead, and Neck.

Subftance.

Its temperature, is like the reft of the Flefh, hot and moift; and it hath its original from the Blood.

Temperature.

It is fituated under the Fat, and ftretched out over the whol body univerfally, and is the fourth covering of the body. In bruits it is next to the Skin, which often moves by the intervening of this Membrane.

Situation.

It is one fingle Membrane.

Number.

It hath no proper Figure, unlefs the Figure of the body which it covers.

Figure.

It hath various colors in Difverfe places; for it is more red in the Neck, Forehead, and Cods, than elfe where.

Color.

It is joyned to the Fat infeperably in fome places; fo that the Flefhy, and Fatty Membrane, feem to make but one: in other places it may be feperated.

Connexion.

It communicates with the principal parts, by the extremities of the Veins, Arteries, and Nerves.

Communion.

And that it is very Senfible, the rigor, and trembling of the body, which depends upon this Membrane, witneffeeth: befides it hath a peculiar Motion in the Neck, Forehead, and Cods, where it is Musculous, and endued with Nervous Fibres.

Action.

Its ufe is to give foundation to the collecting and generating the Fat, to Cloath the Body, and cherifh the internal heat, and defend it from external injuries.

ufe.

The Medicinal Consideration.

Although, Cutaneous Difeaies feem to belong to the Skin; yet if they continue long

long they have their foundation in the fleshy and fatty Membrane ; shivering, shaking and trembling, belong especially to the Fleshy Membrane.

Chap. 9. Of the Common Membrane of the Muscles.

THe Fleshy Membrane being taken away, the common Membrane of the Muscles of the *Abdomen* follows next, being the fifth common covering of the body, which comprehends all the Muscles in the body, (besides the proper Membrane of every Muscle) least in their Motion, they should pass out of their places.

Substance.	Its Substance is very strong, yet thin and Nervous.
Temper.	It is spermatical, cold and dry, in temperature.
Original.	It hath its original, from the first formation.
Scituation.	It immediatly covers, and straitly binds in the Muscles, over which it is stretched.
Quantity.	Its wideness is thought to equal the dimension of the whole body ; but in the Face, Neck, and superior Limbs, it is not easily found ; and in the Legs, the <i>Fascia Lata</i> performs its Office.
Number.	Seeing it is admirable thin, it cannot be divided into two Membranes.
Figure.	It acquires its Figure, from the Parts it contains.
Color.	In Color, it is whitish.
Connexion.	It sticks stoutly to the Muscles, which it compasseth, neither can it be pulled off, but by a Skilful Dissector.
Communion.	It hath no peculiar Nerves, Veins, nor Arteries
Use.	It is nourished, and is sensible, like the other common parts, It is of admirable use, for it compasseth the Muscles like a girdle, and together with the Fleshy Membrane, is the foundation of the Fat ; therefore, where it, or something like it, which performs its Office, is wanting, there the Fat also is wanting ; as in the <i>Forehead, Head, Face, and Cords</i> , where the Fleshy Membrane immediatly toucheth the Skin, without any Fat : between them.

Chap. 10. Of a Muscle in the general.

BEfore I treat of the Muscles of the Belly, I will premise the general Doctrine of the Muscles.

Definition.	A Muscle is an instrument of voluntary motion, which depends upon our own will, and because it governs the actions,
Substance.	It is a dissimilar part, compounded of many similar ones ; but of those Parts, Flesh is predominante. So that the substance of the Muscle, is judged to be Fleshy : Yea and the Muscles are to be understood by the word <i>Flesh</i> in antient Authors ; as <i>Hippocrates</i> , and <i>Aristotle</i> .
Temperatura.	Besides, the Flesh, a Vein, an Artery, a Nerve, <i>Fibres</i> , a Membrane, a Ligament, or tendon, help to make up the composition of a Muscle.
Original.	Seeing then they are Fleshy, their Temperature is hot and moist.
and Insercion.	The true original of a Muscle, is from blood in the conformation of the first Parts ; but by reason of its Connexion, in two extremes, It is said to arise from a stable Part, and to be inserted into a movable part, because it is ordained for motion, and all motion is caused by that which moves not.
Quantity.	This original and insertion, is known by the ducture and series of the <i>Fibres</i> , by which you may Judge of the Scituation of the Muscle, whether right, Oblique, or transverse ; for in these positions all the Muscles in the body of man, both internal, and external, lie.
Number.	Their quantity and magnitude, is various, according to the variety of places, and parts to be moved, which require either greater, or smaller Muscles.
	There are abundance of them in number, which according to my Observation and computation, are four hundred thirty one : but because our body is double, the Muscles also are double ; few there are without fellows, such as are the <i>Sphincters</i> ;

sters; and the *Diaphragma*, or Midriff.

Their Figure is various, ^a Square, ^b Triangular, ^c round, ^d Long, ^e *Trapezia*, ^f *Deltois*, like the Greek Delta Δ & *Scalena*: usually they are round, whether you regard their Circumference, or bulk in long and thick Muscles: Therefore *Hippocrates* in *Lib. de art.* Defines a Muscle to be Flesh Circumducted in an orb: but the greatest Parts of the Muscles have a longish figure.

For the most parts, you shall observe the middle Part swelled, the extremities narrow. The middle part is called the Belly; in the immovable extremity; the Head, the moveable extremity, the Tendon, or *Aponurosis*, which is the end, or inserion of the Muscle into the Part to be moved. Each extremity of the Muscle for the most Part, is Nervous; but the Tendon is Nervous in almost all the long Muscles: the Belly is fleshy, and Seldom Nervous.

The Color of a Muscle, for the most Part, is red; of a leaden Color in some few, by reason of their impure Scituation, in some filthy place.

The Connexion of the Muscles is twofold; in the two extremities, and in diverse Parts; the one of which stands still, the other moves: also the Muscles move the Parts to which they stick, though they were not appointed for that use.

All the Muscles have communion with the Parts, by Veins, Arteries, and Nerves; which they admit above the Belly, or middle part of their Body, by which they obtain their motive power.

The Action of the Muscles, is either universal, or particular. Universal action, is that which agrees to all of them, *Viz.* Motion: particular action, is the motion of some one certain Part; this motion is performed by contraction of the Muscle; whilst it is drawn back, towards its beginning, made shorter, and swells outwardly; and this agrees withal the Muscles, those of the *Abdomen* excepted, which being drawn back, swell within, because they have no opposite bone to with-hold them.

Therefore the true action of a Muscle, is contraction, or conservation of what is drawn; which motion is called *Tonicus*, in one Muscle remaining long in on figure; or in more Muscles extended, and acting together, as when the whole hand is long held elevated, and extended.

The motion of others Muscles, as extension and relaxation, are only by accident; from these motions depend the motions of the parts, which are not only distinguished by difference of place before, behind, upwards, downwards; but also by figure.

Their Scituation is either larger, and that right, and is called *Extensio*; or Oblique, and that is either lateral, as the *Abductor*, and *Adductor* of the fingers; or with inversion, as the *Pronatio*, and *Supinatio* in the hand and *Radius*.

Also the Muscles, by reason of their like motion, are called fellows, Or pairs; fellows are sometimes in diverse & opposite places, & yet perform the same actions; the Muscles which bow the Arms: such Muscles as perform a contrary motion are called Antagonists, and so such as bow the Arm, are antagonists to those that extend it.

Such as are fellows are alike, for the most Part, in Magnitude, Number, and strength; such as are antagonists differ according to the waight of the Part moved, or the vehemence of the action.

The ducture of the *Fibres*, shews the manner of action in every Muscle; and by them you may easily distinguish a right Muscle from a transverse, and Oblique.

The ducture of the *Fibres* is various also in the same Muscle, according to the diversity of its rises or inserions; and therefore one Muscle performs diverse actions, as the *Trapezium*; for by the extremities of the *Fibres*, you may know the Head and Tendon.

The Tendon is directly opposite to the Head.

If the Muscle act but one action, or many; according to the variety of its originals, it obtains various Connexions, to wit, Heads and Tendons.

^a T. 10. f. 1. NN. T. 14. f. 2. OO. ^b T. 10. f. 1. ^c T. 22. f. 1. CD. ^d T. 14. f. 2. MM. T. 15. f. 18. AA. ^e T. 14. f. 1. AA. ^f T. 22. f. 1. A. ^g T. 13. f. 18. BB.

CHAP.

Figure.

Belly.
Head,
Tendon.

Color.

Connexion.

Communion.

Action:

Diversity.

How it is known.

Chap. 11. Of a Tendon.

A Tendon is the least Part of a Muscle, by which we bend and move the bones. It is thought to consist of a Nerve, and a Ligament mixed together; so as that a Tendon is not found, unless it be in that Part of the Muscle where it is affixed to the Parts moved.

Original.

But a mans Eyes (if he wil beleeeve them) tels him, that they are from the first formation, and that they are the cheifest Part of the Muscle, and take their beginning where the Muscle begins, and are disseminated through its whol Body. if it be a Nervous Tendon in the beginning, such it is in the end; if it be like smal strings at beginning, they are united to forme the Tendon afterwards. Such Tendons those Muscles have which perform strong actions, in bowing and extending, and tonical motion; as in the superior and inferior Limbs, and in the back to uphold che Trunk of the body. The rest of the Muscles, as they are fibrous at the beginning, so they are at the end.

The hard and stiff Tendons have much Fat about them to soften them, that they may the easier be moved; and therefore those *Fibres* dispersed amongst the Flesh, are nothing else but the Tendon divided, and the Tendon nothing else but the *Fibres* united; and therefore a Tendon is either compact and solid, or elle divided into *Fibres*.

Also Tendons are sollid or plain, or Membranous or round, or short or long. If they are Nervous at the beginning of the Muscle, so they are at the end. Sometimes they are Nervous at the end of the Muscle, though the Head of it be Fleshy.

The hardness of a Sollid, long and Membranous Tendon, its thickness and Silver color is excellent: So that *Fallopins* affirmed, nothing was more beautiful in the Body of man, than a Tendon, and the Chrystalline Humor of the Eye.

Wherefore a Tendon, seeing it is a Similary Part, is bred of Seed, and is of a peculiar substance; no where to be found out of a Muscle. It wel deserves to be called the cheifest part of the Muscle, upon which the action of the Muscle depends; the other Parts work together with the Tendon in the same action.

Chap. 12. Of the Muscles of the Belly.

THe Flesh extended over the Belly, is Musculous, which being joyned together, do make the Fleshy covering, which is Proper to it.

Number.

They are divided into twelve Muscles, six on each side, which have names partly from their Scituation and rise, and partly from their Figure; of which Sort are *Obliquus Descendens*, *Obliquus Ascendens*, *Rectus*, *Transversus*, *Pyramidalis*, and *Cremaster*.

Of these ten are ordained to compel the internal Parts, and some to move the *Os Sacrum*, and *Ilium*; the two *Cremasters* hold up the stones.

Figure.

Every one of them hath his proper Figure; the Oblique ones, in regard of their Scituation action and *Fibres*, are divided into ascending and descending; the ascending and Transverse, carry a plain Figure like a Membrane.

Largeness.

Their largeness is as great as the Latitude and bignets of half the Belly, and yet the descending Oblique Muscle is larger then the Ascending, and the Ascending then the transverse: the length of the right Muscle, reacheth from the sword-like Cartilage to the *Os Pubis*.

Original.

Although their Original be different, yet they al joyn so at the white line, that they seem to be but one Muscle. The White Line passeth from the Sword-like Cartilage by the Navel, to the *Os Pubis*, and makes a difference between the Muscles.

Although

Although the Muscles of the Belly stick to diverse parts, from which they are said to arise, yet are they all inserted at the white line of the Belly; and at the *Os Pubis*, each of them receives peculiar Veins, Arteries, and Nerves.

Connexion.

The action of the Belly, is common, or particular. That is common which all of them equally act, Namely, to compress the Belly on every Part; neither can they act asunder in this. The particular action is, when Muscles that are parts act apart, viz. Ascending or descending Muscles; those compress the breast, these move the *Os Pubis*, *Ilium*, and *Sacrum*, being joyned together, without any the least compression of the *Abdomen*; but these bones remain unmoved whilst the *Abdomen* is compressed.

Action.
Common.
Particular.

The use of the Muscles of the *Abdomen*, is whilst they lie still, to cover the internal parts, and defend them from external injuries, to cherish and conserve the internal heat.

Use.

Past we now to a particular description of the Muscles of the *Abdomen*, then of the Muscles that move the *Os Pubis*, and *Sacrum*.

The ^a Oblique descending being situate Obliquely, by reason of its *Fibres*, Oblique descending ariseth from the ^b seven or eight inferior Ribs, by certain fleshy intersections or *Fibres* intertexted with the Fleshy *Fibres* of the *Serratus Major*, and sticking to the *Os Ilium*, and *Pubis*, it ends in a broad ^c Tendon in the white line, and together with its fellow, makes one individual Tendon.

Particular
Description.
Oblique descending.

The Oblique ^d Ascending, ariseth from the ^e *Os Pubis*, and *Ilium*, and being knit to the brims of all the bastard and true Ribs, even to the sword-like Cartilage, it ends in the ^f white line by a broad Tendon. In this Muscle the late Anatomists observe a double Tendon embracing the right Muscle like a sheath; but the duplicity of the Tendon appears only above the Navel; for below, it is altogether inseparable.

Oblique ascending.

The right Muscle remains ^f fleshy from the *Sternum*, near the ^g sword-like Cartilage, and being extended along the longitude of the Belly, it is inserted with a Nervous end into the *Os Pubis*.

Right.

In it you may observe three Nervous ^h Intersections which strengthen it, and Veins which run along the longitude of it; and the ⁱ *Mammary descending*, and the ^k *Epigastrick ascending*, meet about the ^l middle of this Muscle.

By this *Anastomosis*, *Galen* thought the consent of the Womb with the Dugs, was caused, and many modern Anatomists after him, which indeed is true.

Upon the extremities of the right Muscles, ly two small Muscles, called ^m *Pyramidales*, which sometimes are wanting, especial lie the right; but flesh makes up the defect. Their office is to compress the Bladder, and therefore they send their Tendons between the right Muscles, into that Part of the *Peritoneum* which includes the Bladder. And in the Child in the Womb, the ⁿ *Urachus* is a production of the Pyramidal Tendons, which in Men of Age, makes but one string affixed to the bottom of the Bladder, and passing to the hole of the Navel, and remains still in such as are grown up.

Pyramidales.

The ^o transverse Muscle, arising from the ^p transverse *Apophyses* of the *Vertebrae* of the loyns, and being fixed to the *Os Ilium*, and the bastard Ribs, ends under the right Muscle, by a broad ^q Tendon in the white line, and is strictly united with his fellow.

Transversus.

Besides the Muscles which compress the Belly, near the *Pubis*, by the transversal Longitude of the groin, is the Muscle ^r *Cremaster*, prepared for the holding up of the stones. It is distinguished from the flesh of the Oblique ascending Muscle, because it hath red flesh, is thinner, and disjoyned from it a fingers breadth; it is involved with the *Peritoneum*, even til it come to the Testicle, and makes the Tunicle called ^s *Erithrois*.

Cremaster.

You shall perceive in the groin, the perforation of the Tendons of the Muscles of the *Abdomen*, that they may give passage to the *Peritoneum*, and the *Cremasters*.

How the motion of the Os Ilium, and Sacrum, is performed.

Seeing some of the Muscles of the *Abdomen*, conduce to the motion of the *Os Ilium*, and *Sacrum*, I shall faithfully describe the motion of them, and the Muscles appoynted for that motion. These bones are closely joyned by *Symphysis*, and lie above the *Thigh-bones*, and under the bones of the loyns, for the procreation of man in the act of *Copulation*; in which action, the *Thighs*, and *Back-bone* remaining immovable, only these bones move forewards, and backwards; the right and Oblique descending Muscles move them forewards, the breast resting, or very lightly moving, and that by longer intervals; the Muscles, *Sacer*, and *Semispinatus*, move them Backwards.

And therefore sacred Scripture, constitutes the Seat of lust to be in the Loyns, because by the motion of the Loyns, the Reins wax hot, which provokes the Genitals to Eiaculation of Seed: *Gen. 36.* It is written, *Kings shall come out of thy Loynes*; and *Psal. 73.* The Kingly Prophet complains, *His loynes were filled with delusions*, that is, with lustful Concupiscence, as *St. Jerom* interprets it; and in *Luke*, *Let your Loyns be girded*, that is, preserve your Chastity.

^a T. 1. f. 2. G G. H H. I I. ^b T. 2. f. 2. G. H H. f. 8. a a. ^c T. 1. f. 2. I I I I. T. 2. f. 8. B B. ^d T. 2. f. 8. B. ^e T. 2. f. 8. c c c c. ^f T. 2. f. 8. d d. ^g T. 2. f. 8. e e. f. 9. B. ^h T. 2. f. 9. c. ⁱ f. 9. e. ^k f. 9. d d d d. ^l T. 2. f. 9. d. ^m T. 2. f. 9. f. ⁿ T. 2. f. 9. e. ^o T. 2. f. 9. D D. ^p T. 8. f. 2. C. ^q f. 9. A. ^r f. 9. a a a. ^s f. 9. b. b. ^t b. f. 2. D D. ^v T. 14. f. 4. B B. f. 3. D D. f. 4. A A.

The Medicinal Consideration.

In the Muscles of the Belly, are often Inflammations, Imposthumes, and pains arising of wind; for according to *Hippocrates*, the pores of the flesh, and space between the Muscles, are filled with Blood and Spirit in such as are healthy; but with Wheyish substance, and wind in such as are Sick; and therefore Cramps happen in these Muscles, as is described by *Sennertus Lib. 3. Part. 10. Chap. 8. Med Pract.* And therefore these Muscles are sometimes troubled with a windy Spirit, arising from the Hypochondriacal Parts, being filled with Melancholly.

Chap. 13. Of the Peritoneum.

THe Muscles of the Belly being taken away, the *Peritoneum* comes to view, which is a ^a Membrane stretched out over all the Parts of the Bowels, or Guts; from which extension, it hath it's Greek Name.

Temperature.
Substance.

Seeing it is spermatrical, Its temperature can be no other than cold and dry.

Its Substance is not simple, and uniform; but double, and unequal in thickness: for it is a double Membrane, joyned in some places, and disjoyned in other Some; to give passage to the Navel Vessels; and in the *Hypogastrium*, it is so doubled that it contains the Bladder and the Genitals, the Reins and Vreters, the *Vena Cava*, and the great Artery, and the Seminal Vessels in its duobling.

The inequality of the substance of it is observed in Women, to be thickest from the Navel to the *Pubis*, that in the conception it may be stretched as the Womb is. But in men it is thickest from the Navel to the Sword-like Cartilage, that in Gluttons it may stretch when their paunch is full.

Original.

It takes its original from the first formation, unless, as some think, it take its original from the *Dura Mater*, which as they produce the *Pleura*, so the *Pleura* should the *Peritoneum*; and so their should be a continuation of these Membranes throughout the Body, as their is of the Skin.

Scituation.

Its Scituation is immediatly after the Muscles, and compasseth about all the Bowels of the *Abdomen*.

Quantity.

It is the largest Membrane in the whol Body, and most capacious, and answers to the inferior Ventricle both in Longitude and Latitude,

It

It is double every where, because it consists of two Membranes; of which, the internal is the shortest; not so much because it bestows a Membrane upon every Part of the Belly and produceth the *Mesenterium*; but because it doth not accompany the external to the Testicles, but ends in the Cavities of the *Abdomen*.

The external passeth even to the Cods, and wraps the Testicles round, and makes that tunicle called *Erythrois*, and in its progress makes a smal Channel by which the Spermatick Vessels pass.

The same production of the external tunicle, is observed in the groin of Women, and is diduced even to the *Clitoris*, and the round and lower Ligament of the *Womb*.

The Figure of the *Peritoneum* is Oval, and longish, by reason of the Belly, for of it self it hath no Figure at al.

Figure.

Its continuity is not pierced, it being an admirable piece of workmanship; for although Vessels pass into it, and out from it, yet al this is performed through the doubling of it, so that the internal Tunicle remains unpierced, which comprehends the Parts of the first Region, as the external doth the Parts of the second Region, which are placed within the Belly.

The Color of the *Peritoneum* is white, as the Color of other Membranes is.

Color.
Connexion.

It is firmly knit to the *Vertebrae* of the loyns, I mean the external Membrane, the internal hath no Connexion with them, but is disjoyned to receive the Reins, and redoubled to make the *Mesenterium*; also it gives a covering to the *Diaphragma*, and the Liver, and produceth the Ligament which holds it, and depends upon the Sword-like Cartilage.

Besides the general communion it hath with the principal Parts, by Veins, Arteries, and Nerves; It hath a particular communion with al the Parts contained; to which it gives Membranes, either thick or thin; and therefore it may be called the Mother of al the Membranes in the Belly.

Communion.

It performs no action; but its use is great through out the Belly.

Use.

^a T. 2. f. 9. g. g. ^b T. 6. f. 2. C C. E E. ^c T. 7. f. 4. I I. K. f. 5. A. ^d T. 7. f. 2. S S. f. 4. F F.

The Medicinal Consideration.

Let us now bring this contemplation of the *Peritoneum*, to a Physical use. By reason of its doubling, you shall perceive Serous and sharp Cholerick Humors to get into those spaces, which make a bastard Collick, but have no foundation at al within the Guts, as a true Collick hath, but between the *Peritoneum* and the Guts; whence the Disease is bitter, and usually lasting: of which see *Fernelius* in his *Pathology*.

Sometimes other Humors flowing from the Liver, or from the Reins, get within this Duplication, towards the Navel, or groyn, or *Os Sacrum*, and there impostumate, unless they were turned into Quittor before they fell into this Part.

Collick.

Such Collickal pains lie usually on the top of the Belly, and not deep; neither wil they suffer the Belly to be handled never so gently. Sometimes they come up even to the *Diaphragma*, by reason of the continuation of the *Peritoneum*, and then the danger is the greater.

Sometimes, by reason of those Productions of the *Peritoneum* which reach the Stones, Serous Humors pass down to the Cods, and make a watry Rupture.

Ruptures.

You must diligently observe the production of the *Peritoneum* by the groyn; which being dilated (for it is seldom broken) receiveth the Gut *Ilium*, or the Call, whence is bred that swelling in the Groine, called *Entero-Cele*, or that called *Epiplo-Cele*; or when both the Gut and the Call do fall down, that other called *Entero-Epiplo-Cele*.

Cha. 14. The Division of the Parts of the Belly.

Parts first.

THe Parts of the Paunch included within the *Peritoneum*, I thus divide. They all pertain to the first Region, which are nourished by the branches of the *Vena Porta*; therefore the ^a*Omentum*, the ^b*Hollow* Part of the *Liver*, the ^c*Gal*, ^d*Stomach*, ^e*Spleen*, ^f*Sweet-bread*, ^g*Bowels*, ^h*Mesenterium*, and ⁱ*Vena Porta*, and the ^k*Cœliacal Artery*, make the *First Region* of the Body, contained within the *Abdomen*. The other Parts which are included within the doubling of the *Peritoneum*, are referred to the Second Region, which comprehends the ^l*Reins*, ^m*Vreters*, ⁿ*Bladder*, ^o*Genitals* in Men; and the ^p*Womb*, with the Parts annexed, in Women.

Second.

It is extended even to the upper Part of the *Breast*, and comprehends the *Diaphragma*, ^r*Mediastinum*, ^sthe *Heart*, and ^t*Pericardium*, ^v*Lungs*, ^x*Trachea*, ^y*Arteria*, ^z*Oesophagus*, ^a*Tongue*, ^b*Larinx*, with the Trunks of the *Vena Cava*; and great Artery, even from the Throat to the groin, according to *Fernelius*: but I extend it farther, even to the Limbs; whither so ever the greater Channels of the *Aorta* or *Cava*, the ^β*Axillars*, and ^γ*Crurals* pass.

^a T. 2. f. 10. E. ^b T. 4. f. 1. A. ^c f. 1. C. ^d T. 2. f. 10. C. ^e T. 4. f. 1. D. ^f f. 1. EE. ^g T. 3. f. 1. and 4. ^h f. 1. AA. ⁱ T. 4. f. 1. FF. f. 6. AA. ^k F. 5. K. ^l T. 5. f. 1. BC. ^m f. 1. FF. GG. ⁿ f. 1. K. ^o T. 6. tota. ^p t. 7. tota. ^q T. 7. f. 1. II. f. 6. AA. FF. ^r f. 4. AA. ^s t. 11. f. 2. B. ^t f. 5. I. ^u f. 1. A. f. 2. A. ^v f. 1. BB. f. 2. KK. f. 7. FF. ^x f. 7. E. f. 8. ^y ABC. T. 13. f. 10. 9. ^z T. 3. f. 2. EE. ^a T. 13. f. 14. A. ^b T. 13. f. 9. 10. ^c T. 12. f. 1. 4. BB. ^d f. 1. 4. DD.

Chap. 15. Of the Navel.

What it is.

THe Navel from the birth, even to extream Age, is a knotty ^a*Coition* of the four Navel ^b*Vessels*; by which the Child is nourished in the Womb. That they should stick out on the out-side of the Belly, is unprofitable; therefore they are Cut off the ^c*Child* being born.

The continuation of the Vessels within the *Abdomen* remains, which grows dry by degrees, being deprived of its ancient Office; and therefore it is to be considered under another Notion, in one that is grown up.

Umbilical Vessels.

We shall treat of the *Umbilical Vessels*, as they are found in the Carcass of a man grown up; they are like *Ligaments*, included in the doubling of the *Peritoneum*; that which outwardly appears is the middle both of the Belly, and Body.

The ^d*Umbilical Vein* passeth to the ^ecleft of the *Liver*, The *Umbilical* ^f*Arteries* are ^gtwo, and descend to the *Bladder* ^h*Arteries*, Sometimes creeping along the sides of the *Bladder* to the ⁱ*Hypogastricks*, between the Arteries lies the ^k*Urachus* fixed to the sides of the *Bladder*, and this is the original and insertion of the *Umbilical Vessels*. The *Urachus* is like a long and round *Ligament*, and its use is to hold up the *Bladder*.

Use.

The *Umbilical Vein* pulls the *Liver* forward, lest by its waight it should depress the Parts under it, The *Umbilical Artery* upholds the ^l*Bladder* that it fall not down, although it be included in the doubling of the *Peritoneum*.

^a T. 8. f. 2. D. D. ^b T. 8. f. 2. ABBC. ^c T. 9. f. 2. P. ^d T. 2. f. 8. G. ^e T. 4. f. 1. ^f f. 6. aa. ^g T. 8. f. 2. A. ^h T. 4. f. 5. C. ⁱ f. T. 8. f. 2. BB. f. 4. ^j T. 2. f. 10. ^k f. 4. dd. ^l f. 4. 2 2 vel. 22. ^m T. 8. f. 2. C. T. 9. f. 2. O. ⁿ t. 2. f. 10. H. I.

The Medicinal Consideration.

To reduce that is said to Medicinal use; this shews that the Cutting of the Navel Vein is dangerous, that the place of the Navel is very perspirable because it penetrates the containing Parts, Neither is there any thing, either within or without, that stops that passage, and therefore purging Medicines applyed, to the Navel Purge, and sweet things applyed to the Navel of Women penetrate to the Womb: The Water in Droplies many times breakes out at the Navel, and the affects thereof are grievous, not so much by reason of the sensibility of the Part, but the suddain hurting of those Parts whose Office it is to nourish the whol Body.

Therefore consider whether the Navel be the centre of the Belly or not, for otherwise, if the Parts below the Navel be longer than those above it, A multitude of Diseases are bred in the lower Part, because the Umbilicar Vein being shorter doth not sufficiently, pul back the Liver, which, by its waight, compresseth the Stomach and Parts under it.

Chap. 16. Of the Omentum, or Call.

Before you proceed to the Omentum or cal you must view how it covers al the Parts of the Belly, then their Situation, which is of no smal moment to the art of Physick.

The ^a Omentum, or Epiploon, or Cal, is a thin Membrane endewed with much Fat, neither is it single but double, and so disjoyned in some places, that you may thrust your hand between, this you may see in that Part which is stretched out above the Guts, but about the Stomach and Spleen neer the Diaphragma, the space is not so evident, but it hath certain hiding places as the Poet Lucan saith, which not appearing was a bad Omen..

It was held to be an ill Omen also amongst the sooth saiers if it were not extended over the Guts.

The portion of it which is subject to view, is Naturally stretched out even to the Navel, sometimes to the groyn and Cods in Women between the Neck of the Womb and the Bladder, the greater portion is hidden in the left Hypochondrium.

It may be divided into four Parts, the first is called ^b Intestinal which is stretched out over the Guts; the Second ^c Hepatical, which ariseth from the Cavity of the Liver, including the smal Lobe of the Liver, and turns down to the deep Cavities thereof, the third is called ^d Lienal, because it lies upon the Spleen, the fourth ^e Mesenterical, being a production of the Mesenterium to the external Parts, and from it is its original to be fetched.

^a T. 2. f. 10. E. b c d. T. 3. f. 1. D D. ^b T. 2. f. 10. d d. ^c f. 10. b. ^d f. 10. c. ^e T. 3. f. 1. T. 4. f. 1.

The Medicinal Consideration.

The Omentum hath its Diseases, both Similar, Organical, and Common, for sometimes it is distempered and inflamed, and yet but seldome, it is oftner troubled with Imposthumes or Aposthemes which you wil, because it receives the filth of the Liver and Spleen. Sometimes its mightily encreased with Flegm gathered together, and grows to a huge bigness; neither is this swelling easily allayed either by internal, or external Medicines. If it be soft, Suppuration is to be sought, which seldom succeeds as it should do, although you open the Part with a Caustic.

Sometimes a dropical Water is concluded in the Cavities of the Omentum: according to the Judgment of Hippocrates, and this is worse then if it were within the Abdomen, because it is easier drunk up by the Meseraick Veins; or by the Spunginess of the Spleen, the passages being first opened, and those Parts stirred up to it by some convenient Medicine.

Number.

Situation.

Original.

Diseases.
Similar.

Organical.

The

Common.

The *Omentum* Falls down into the groine or Cods: and causeth those swellings which are commonly called Ruptures: the Belly being wounded, the *Omentum* breaks forth: and then a great portion of it may be tyed with a string neer the Belly and so cut of, because it soon putrifies, neither is it safe to put it back again.

The first Concoction is made never the weaker by cuttings off Part of the *Omentum*, (though *Galen* thought otherwise) For the Concoction is made in the Stomach: and the *Omentum* doth not cover the Stomach, But is only knit to the bottom of it.

Chap. 17. Of the Guts.

Use.

THE Guts follow next according to the order of dissection, which are organical Parts, hollow, appointed to carry the Chyle and to receive the Excrements. The thin Guts are appointed for the Chyle, the thick for the Excrements.

Substance.
Fleshy.

Their substance is Membranous and full of strings, which may be divided into two proper Membranes, of which, the ^a Inner is Fleshy, the ^b outward Nervous. But the Inner is rugged, and as it were foulded that it may stay the Chyle in its wrinkles. that so the Mesaraick Veins may draw it the better, which like Horse-leeches draw the thinner Part of the Chyle from the Guts.

Nervous.

Besides the wrinkles, the Inside of the Guts is bedewed, And as it were defended with a certaine Flegmatick Slime, least the Membrane should be hurt by the passage of Choler.

Slimy.

Besides these two proper Membranes there is a ^c common one, added from the *Peritoneum*, which it bestowes upon all the Parts it containes.

Scituation.

The Guts are placed in the *Abdomen* and fill its whole Cavity without any confusion; the *Hypochondria* excepted; and are disposed in various turnings by reason of the Connexion they have with the ^d *Mesenterium*.

Longitude.

General Division.

They are seven times as long as the Body, and something longer.

This Longitude is divided into ^e thin, and ^f thick, not according to Scituation, but in respect of the Membranes: The thin which is taken from the inferiour Orifice of the Stomach, is the first & supreme in order, it consists of thin Membranes, the thick, is the Inferior in order, But the superior and shorter in Scituation, and more Capacious and hath thicker Membranes.

Special.

Again, the thin is distinguished into three Parts, or three Guts; of which the first is called ^g *Duodenum*, the second ^h *Jejunum*, the third ⁱ *Ilium*. The thick Gut is also divided into so many Parts or Guts: The first ^k *Cacum*: The second ^l *Colon*. The third ^m *Rectum*.

Cavity.

All the Guts are hollow, that they may give passage to Chyle and Excrements. They are ⁿ wrinkled round about within, all along their Longitude, even from the Stomach to the Fundament, that so they may stay the Chyle and Excrements of the first Concoction; but for expelling the Excrements, they have a kind of motion which presses downward by degrees. And thus much to what is common to all the Guts: It remains that we speak of them all severally.

1. Duodenum.

The first Gut is called ^o *Duodenum*, because in length it is twelve Fingers breadth.

The finding of this Gut is hard, for towards the back bone it must be sought for under the Sweet-bread with the beginning of the *Jejunum*; this position and Intertexture is diligently to be noted, because oftentimes the cause of obstructions & vomitings is without any failing of the *Pylorus*: but the choler flowing by the ^p Biliar Pore is hindered in his passage, and returning back into the Stomach causeth vomiting.

Biliar Pore.

In the very confines of the *Duodenum* and *Jejunum*, the passage of Choler pierceth the Gut, and creeps downward a little way between the Membranes before it pierceth the Inner Membrane, neer which the ^q Channel of the Sweet-bread is observed by *Virfungus*.

Where

Where the Guts begin to be turned toward the left side, their the *Fejunum* begins, which is thought to be emptier than the *Ilium*, by reason of his nearness to the Liver, and its Multitude of Metaraick Veins: It lies altogether in the umbilical Region, and is in length about a Cubit, and an half.

The *Ilium* follows, which is more slender, but in length surpasses all the rest of the Guts. It occupies the *Ilium*, and *Hypogastrium*, and compasseth about the *Fejunum* it self with its inferior Part. In this Gut is that Dileate which is called the twisting of the Guts, and the *Black passion*.

2. *Fejunum*.3. *Ilium*.

Thick Guts.

1. *Cecum*.

The fourth Gut in order, and the first of the thick Guts, is called *Cecum* by Ancient Anatomists, and does retain this Name, although it is altogether unlike to the Ancient description of it. It is not large like a Sack, neither doth it perform the Office of a second Stomach to Concoct the Chyle, which was not perfected before: the Ingress and Egress, are by one hole. Now in its place, a Membranous Appendix is shewed, which is larger in a Child new born, than in a man grown up: and thence *Sylvius* took occasion to write, That many things were changed in our Bodies, both in regard of growth; and of the Guts, *Duodenum* and *Cecum*.

The Gut *Colon* succeeds this; in which are many things worth our Consideration, to wit, its Largeness, Scituation, Ule, Shuttters, two Ligaments, Its fringes of Fat, and its Connexion.

2. *Colon*.

Largeness.

Of all the Guts, none more large, and Capacious, then this. It begins at the right Kidney neer the *Appendix*; and being turned upwards, it lies under the Liver and Stomach, and passeth to the left *Hypochondrium*, where it is wreathed, and made narrower.

In its Obliquation descending, it touches the left Kidney; and a little below, being bowed like a Roman S. it ends in the top of the *Os Sacrum*.

Scituation.

In it, the Dunge and filth of the Guts, is kept: as also the wind of the first Region.

Use.

Least it should be dilated too much by Multitude of Dunge, and Violence of wind, Nature hath strengthened this Gut with two strong Ligaments; which being stretched along its Longitude, they make greater foldings, and wrinckles in this Gut, then in any other. Intomuch that they seem like Cels to retain the Dunge: and because it wants the bond of the *Mesenterium*, and consequently that Humor which proceeds from the Fat of it; Nature hath placed about it, here and there, certain tringes of Fat to Moisten it.

Ligaments.

Fat.

That *Volve*, or Shutter which Authors quarrel so much about, is not to be passed by, being fastned to the beginning of the *Colon*, like a Membranous Circle, which hinders the flowing back of the Dunge into the *Ilium*, and the ascending of a Glister to the same place. Therefore it opens towards the Inferior Parts, that it may let the Dunge pass out, and hinder it from flowing back.

Shuttters.

It is knit to the Membrane of the *Peritoneum*, by a Membranous tye, whatsoever *Laurembergus* wrote, accusing *Riolanus* of Ignorance, or dul-sightedness.

Connexion.

The last of the Guts is called *right*, because it passes straight from the top of the *Os Sacrum*, to the Fundament. This Gut, contrary to the Nature of others, besides the Internal fleshy Membrane, hath also an external *fleshy Musculous* covering, like a sheath; that so it may the more forceably expel the Dunge, which uterh to clod in the extremity of the *Colon*, and right Gut. Therefore besides the compression of the Muscles of the *Abdomen*, and the Natural motion of the *Colon*, this same fleshy Sheath, crusheth the Dunge, as it were with ones hand, that so it may pass out.

3. *Right Gut*.

^a T. 2. f. b. R. ^b f. 5. Q. ^c T. 3. f. 5. PP. ^d f. 1. AA. ^e f. 4. from B. to L. ^f f. 4. from 1. to Q. ^g f. 4. F. ^h f. 4. GG. ⁱ f. 4. HH. ^k T. 2. f. 4. H. ^l f. 4. K. ^m f. 4. M. ⁿ f. 6. R. ^o T. 3. f. 4. F. ^p T. 4. f. 5. HH. ^q f. 3. D. ^r f. 3. C. f. 5. HH. ^s T. 3. f. 4. GG. ^t f. 3. E. ^u f. 3. BB. ^v T. 3. f. 4. HH. ^x f. 4. L. ^y f. 4. KK. ^z f. 1. CC. ^a f. 4. I.

The

The Medicinal Consideration.

General Diseases of the Guts. I pass now to the Diseases and Symptomes of the Guts. They suffer Diseases both Similar Organical and Common. For they are distempered by heat and cold, either with or without Humor. They are inflamed, wounded, Ulcerated, dried, bound, loosened, made smooth the wrinkles being taken away, as in fluxes and bloody fluxes. Sometimes they are so stopped that the Excrements are Vomited up.

Peculiar Diseases. Besides these the common Diseases, the Guts severally considered, have their peculiar Diseases.

Of the Duodenum. The *Duodenum* may be stopped by compression of the Sweet-bread, and then the food is Vomited up again two or three hours after it is eaten; because the passage is stopped.

Ilium. The *Ilium* is subject to the Iliack passion, which is an Inflammation and not a twisting of that Gut; Sometime it falls down into the groin, and sometimes into the Cods, which causeth Ruptures in those places.

Jejunum. Sometimes the *Peritoneum* being loosed or broken neer the Navel, the Disease called *Omphalocoele* commeth, in which the *Jejunum* slips down.

Colon. The *Colon* is subject to the Collick, which ariseth either through sharp Humors, or wind, or extreame cold Air. In it worms are bred, which sometimes creep up into the Stomach and are Vomited out; This Gut alone is subject to Ulcerations, which causeth Putrefaction: which many think, comes from the *Mesenterium*, and most unfortunately use purging Medicines and Glysters which increase the evil and no way help it: Because the extremity of the *Colon* which is joyned to the right Gut is more fleshy, painful Impostums are bred there, which suppurate and are sooner cured then they would be, if they came from the Mesentery.

Sometimes Melancholy hard swellings are bred there which cause difficulty in going to the stool and hasten death.

Right Gut. The right Gut hath its peculiar Diseases, *Tenasmus*, Inflammation, Impostumes, which end in Ulcers and fistulas, which are difficult to be cured and require, the help of the Chirurgion.

The Peristaltick motion of the Guts is Sometimes so perverted, that the Dung flows upward, and Glysters are cast up at the Mouth. And so are suppositories also, if you will believe some Practitioners, but then the shutter of the *Colon* must needs be broken.

Symptomes. All the Symptomes of the Guts are to be referred to the Excrements when they are excessive, as in Fluxes, or deficient, as when men go not to stool unless they be provoked by Medicine, both which Symptomes impair the health.

Fluxes are called *Diarrhea*, which is either Chylous or humoral: humoral is either Caliacal, or Mesenterical, or Intestinal. When it comes with Ulceration, Paine and Blood, it is called a Bloody Flux. If it come without pain, and be like the Water in which raw flesh has bin washt, it comes from the Liver, and is called Hepatica. If it come through smoothness of the Guts, It is called *Lienteria*: if it come with Quitter it is called Mesenterical. The causes of all these Diseases ye may find in all Practitioners, and therefore we will make no longer stay upon them.

The internal Tunicle of the Guts Sometimes is severed & lost, which is thought to be turned into a long worm of two or three Cubits long, called *Tania*, of which you may read in *Spigelius Lib. de Lumbrico lato*.

Chap. 18. *Of the Mesenterium:*

What it is. The *Mesenterium* is the bond of the Guts, which keeps them in there places, that they pass not into confusion and be thereby deprived of there action and use. It

It is a double Membrane, between which, is Fat, and many ^b Glandulae, or Kernels, and a four-fold kind of ^c Vessels. This is the structure of it.

Its Structure.

It is seated in the midst of the Belly, because it sticks to the transverse processes of the Vertebrae by Ligaments: thence is its original.

Situation.

It sticks so firmly to the ^d Guts, that no division at all appears: between its two Membranes, innumerable ^e Veins pass, which are called meseraick or Mesenterick. Also an infinite number of ^f Arteries from the Cæliacal Artery. Also it hath ^f Nerves from the Lumbals, or Nerves of the Loines.

Vessels.

The fourth kind of Vessels, are called ^g Vena lactea, by *Aseubus*, the first finder of them out; of which we need not doubt, seeing it is now a common received truth.

Vena Lactea.

This one thing troubles many, Namely, the diversity of their distribution: For in a beast full fed, that is opened alive, these milky Veins are noted scattered about the Mesenterium; but some pass to the Sweet-bread, others to the Liver, others to the Trunk of the Vena Cava, none of them to the Spleen; neither like other veins are they gathered into one Head; they seem rather to have their Root, and Foundation in the Sweet-bread, and from thence to be distributed this way, and that way.

These Milky Veins being granted, all difficulties which were formerly about the distribution of Chyle and blood by the same Channel, cease. For the Milky Veins carry the Chyle to the Liver, and the Meseraick Veins carry back the Blood to the Nourishing of the Guts. Therefore both these Channels may be stopped severally; which is to be noted of a Physician, in curing of the Diseases of the Bowels.

Use.

The Mesenterium, seeing it communicates with the Liver by the ^h Vena Porta; with the Spleen by the ⁱ Cæliacal Arteries; and the Splenical ^k Vein; with the Guts by their Connexions, and hath a fatty Glandulous substance fit to receive Humors, and to retain all the impurities of the first Region; Physicians well call it the Nurse of Diseases; for from that, as from a Fountain, do all the Diseases of the Bowels proceed: and all Physicians in prescribing Purges, and Remedies, have a special eye to that.

^a T. 3. f. 1. A. A. T. 4. f. 1. H. H. ^b T. 3. f. 1. a a a a. ^c f. 1. B. B. ^d T. 9. f. 1. M. M. ^e T. 4. f. 1. a a a. T. 9. f. 1. c c c. ^f f. 1. b b b b. ^g f. 8. n n. ^h t. 9. f. 1. a a a. b b b. ⁱ T. 4. f. 1. F. F. f. b. A. A. A. ^k f. 5. K. &c. 11.

The Medicinal Consideration.

The Mesenterium labours under Diseases, both Simple, and Compound; it is inflamed, and oftentimes suffers impostumes. It is Ulcerated, and by reason of its Vessels, often obstructed.

Diseases of the Mesenterium.

By reason of this fatty and Glandulous substance, it often swells to a great hard swelling, and is the Foundation of all Kings evil Swellings; which seldom come in great Number, but the Foundation is here.

It is subject to bastard Colicks, which proceed of sharp Cholera, and degenerate into Palies in the inferior Limbs, and sometimes in the superior; and hence comes the *Morbus Ructuosus*, mentioned by Hippocrates, and *Morbus Siccatorius*. Of the Diseases of the Mesenterium, you may read Daniel Sennertus, and Matthew Martinus, who treats expressly of the Diseases thereof. Although the Meseraick, and Milky Veins, which carry Chyle, are fastned to the Guts like Horse-Leeches, yet the matter is diversly drawn by those Channels, For the Liver draws Chyle by the Milky Veins from the Guts, but sends Blood by the Meseraick Veins to the Guts; there ore both of them may be diversly obstructed.

For the milky Veins may be obstructed either all along through the thickness of Chyle; or else in their Roots within the Liver.

If the obstruction be in the whole passage all along, then there ariseth a Chylous

How the Milky Veins are affected.

Flux, &c.

K

How the Mesaraick.

Flux, either white, or sauny in Color. If in their Roots, either within, or neer the Liver, the Chyle hath a light Tincture of Blood.

If the Mesaraick Veins be stopped within the Liver, the Liver cannot disburden it self of his Excrements, but they remaine either in the Liver, or in the Mesaraick Veins, and make most terrible obstructions, by reason of the multitude of the Veins, both within, and without the Liver.

The Milky Veins have no Trunck, but are seperated when they enter the hollow Part of the Liver; and therefore they are not so easily obstructed. And therefore all Humoral Fluxes of the Belly flow from the Liver or from distempers of the Mesaraick Veins. Thick Fluxes proceed from the Milky Veins, by reason of corrupted Chyle.

Cure.

The Cure of both sort of Fluxes is the same, Namely, by such Medicines as cure, and purge out thick Humors: but in Liquid Fluxes of the Mesaraick Veins, you must sometimes use strengthening Medicines, And sometimes bleeding and Vomiting is more proper for these Fluxes, than for thole of the Milky Veins.

Chap. 19. Of the Sweet-bread, or Pancreas.

Substance.

The Sweet-bread is a body neither truly ^b fleshy, nor truly Glandulous, but in a middle betwen both: Yet it is very Syongy, that so it may receive the Excrements of the Spleen and Liver.

Situation.

It lies under the Stomach like a soft Cushion, and is stretched from the ^c Liver to the ^d Spleen; and if it have its Natural conformation, it is as broad as the Palm of the Hand.

Vessels.

It receives the ^e Trunck of the Vena Porta; the Milky Veins, and the ^f Splenical Vein, passeth to the ^g Spleen through its Cavity.

A new Channel

Besides, *Virsungus* Discovered a new ^h Channel in the Sweet-bread, passing along the length of it; which is inserted into the ⁱ Jejunum, neer the ^k passage of Choler: but for what end this was framed is yet uncertaine, whether it be to cleanse the Excrements of the Sweet-bread; or rather of the Spleen, which are carried thither.

Its Use.

So *Fallopins* found the Channels in the Sweet-bread, no way to communicate with the Veins, but that being filled with Choler, they empty themselves into the Bowels: or whether rather, they carry a portion of Chyle to the Spleen, for a particular making of Blood: but if this Channel do not touch the Spleen, then this Office is void, and it must be to cleanse the Sweet-bread of the Excrements it receives, either from the Liver or Spleen; or to carry away the filth of the Chyle, which happily may remain there.

It is observed, that this Part increaseth, when the Spleen decreaseth; so that it may well be called the Spleens deputy. There is the Seat of Hypochondriacal Melancholy, & it is the entertainer of many Diseases, as well as the *Mesenterium*: both of them breed Sickneses to the Body, if they be filled with evil, and filthy Humors.

^a T. 4. f. 1. EE. ^b f. 2. AA. f. 3. AA. ^c f. 1. A. ^d f. 1. D. ^e T. 4. f. 1. FF. ^f T. 9. f. 1. aaa. bbb. ^g f. 1. I. ^h f. 1. D. f. 3. EE. ⁱ f. 3. BB. ^k f. 3. DD.

Chap. 20. Of the Vena Porta.

Two Veins.
Porta.

and
Cava.

Within the Belly, are two notable Veins contained; both of them take their original from the Liver: The one is called ^a Porta, which is subservient to the Places dedicated to nourishment, nether passeth it further. The other is called ^b Cava, which nourisheth the whol Body, from the Crown of the Head to the sole of the Foot, and passeth out of the *Peritoneum*, and creeps along the

the Back and Loines, with the great Artery: Some think it is produced from the Heart, and not from the Liver. The *Vena Porta* ariseth from the hollow Part of the Liver, which it filleth, and is called the Gate of the Liver, or the Vein which is seated at the Gates of the Liver.

The Trunk of the *Vena Porta* descending into the Belly, sends out a branch called *Gastro-Epiploon*, which is distributed to the Stomach, and *Omentum*. The second branch is called *Intestinal*, which is carried to the *Duodenum*: after that, it sends two branches to the Gal, and the last branch it sends to the right side of the Stomach.

These branches thus produced, the Trunk is divided into two famous branches; the *Splenic* and *Mesenterical*. This again, is divided into four branches, of which, the greatest keeps the name *Mesenterical*: The second is called *Hæmorrhoida*, and passeth to the right Gut: The third is called *Cacalis*, and passeth to the Gut *Cæcum*, or else to the beginning of the *Colon*: and the fourth passeth to, and nourisheth the remainder of the *Colon*.

The splenic branch, when it hath passed through the Sweet-bread, produceth four opposite Veins, above and below. The first is called *Gastrica Major*, which ascends to the left side of the Stomach. Opposite to this is the right *Epiploica*, which is distributed to the *Omentum*. The *Coronaria* succeeds this, and is distributed to the Stomach, and the left *Epiploica*, to the *Omentum*.

^a T. 4. f. 1. F. F. ^b T. 5. f. 2. F. T. 12. f. 1. C. ^c T. 5. f. 2. G. T. 12. f. 2. C. ^d T. 4. f. 5. m. ^e f. 6. d d. ^f f. 6. B. ^g f. 6. gg. ^h f. 6. C D. ⁱ f. 6. I L. ^k T. 4. f. 6. ee ^l f. 6. e.

Chap. 21. What is to be considered in the Vena Porta.

Any things come to be considered in the *Vena Porta*.

1. It makes the first Region of the Body, with those Parts which it nourisheth, and passeth with its Blood.

2. It contains a peculiar sort of blood, which is not circled, as the Blood of the *Vena Cava* is; and yet it may with the branches of the *Cæliacal Artery*, have a transflux, and transvasation.

3. That it carries only Blood, and not Chyle, which is done by the Milky Veins, as also the impurities of the Liver and Spleen, to the *Mesenterium*, Sweet-bread, and Guts.

4. That within the Liver, it hath either very smal, or no Communion at al by its Roots, with the Roots of the *Vena Cava*; and therefore each Vein carries its peculiar Blood. The blood of the *Vena Porta* is thick, and nourisheth the parts of the first Region. The blood of the *Vena Cava*, is subtiler, fit for circulation, which nourisheth the parts of the second, and third Region.

5. That the branches of the *Vena Porta* within the Liver, are larger than those of the *Vena Cava*, if that do arise from thence.

6. That in a Diseased body, it is usually filled with *Caco-Chymia*; which, whether it ought to be emptied by breathing a Vein, a man may wel make a scruple, lest the Circulation of blood infect the whol Mass.

7. Whether the *Vena Porta*, after two or three Evacuations by the Arm, may not better be purged by the Hemorrhoids, or opening a Vein in one of the Feet?

8. That al impurities of the Belly, are contained in this Vein, from whence come terrible obstructions of the Spleen, and *Mesenterium*.

9. That there are no Shutters found in this Vein, as there are in the branches of the *Vena Cava*.

10. That the *Vena Porta* hath waies, whereby it disburdens it self, as the Veins

Branches of
the *Vena Por-
ta*.
Superior.

Inferior.

Place,

Blood.

Office.

Communion.

Largeness.

Evacuation.

Obstructions.

of the Hemorrhoids: its reflux into the great Artery by the Cæliacal, and Vomiting of Blood against Nature, in Plethorick Bodies.

Chap. 22. Of the Cæliacal Artery.

O.iginal. **T**His is a branch of the great Artery descending, and accompanies the branches of the *Vena Porta*: for look how many branches the *Vena Porta* is divided into, so many also, is the ^a Cæliacal Artery divided; which notwithstanding, hath Pulse from the heart, and follows the motion thereof, as other Arteries do: but seeing his blood enjoys not the benefit of circulation, as other Arteries do, so that it seems like a separated Artery, Sometimes his motion is hindered, when there is an Inflammation in the *Abdomen*; the rest of the Arteries gently moving, as is often observed in Hypochondriack Melancholy, and other inflammations of the *Hypochondrium*.

Motion. Notwithstanding it hath Communion with the *Vena Porta* by mutual conjunction of their mouths; by which means there is a conflux of blood between them, whereby the vital Spirit of the *Abdomen*, is preserved.

This Pullation, or Palpitation, was known to *Hippocrates*, in *Lib. 7. Epid.* In that History of his, about the pullation of the belly, neer the Navel; and in his Prognosticks he makes mention of the same; *If the Veins about the Midriff beat, they foreshew either trouble of mind, or Madnes.*

The Cæliacal Artery in *Hippocrates* Book of the Diseases of Women, is called, the breathing place of the inferior Belly: See *Duretus* in *Coacis. Page, 183.*

Destivine of the Splenical Artery. The ^b Splenical Artery, is notable; which is not brought by the Sweet-bread, but creeps along the Longitude of the *Diaphragma*, neer the back bone: it is as big as the Splenical Vein, but Ambiguous in his progress, and gives no branches to the Parts neer it.

It is inserted into the Spleen by a double branch, as the Splenical Vein is; and therefore when the Cæliacal Artery is taken away, it is in vain to look for the Splenical; for there remains none, but two or three small Arteries, which pass to the Stomach.

From the Splenical Artery, neer the Spleen, pass two small Arteries to the Stomach. From this faithful and true relation, you may easily know how malignant Vapours are carried from the Spleen and *Mesenterium*, to the Heart; whence in *Plautus*, he complained, that *he had a Splenitick Heart, it leaped, and beat his Brest.*

^a T. 12. f. 2. p. q. r. ^b f. 2. t.

Chap. 23. Of the Stomach.

Membranes of the Stomach. **T**He Stomach is the Kitchen of the first Concoction; it consists of proper Membranes, and one ^a common, one which it receives from the *Peritoneum*. The ^b internal is rugged, and hairy, like a peice of Silk: The ^c External is fleshy, that it may receive the heat of the Bowels which lie upon it, to wit, of the Liver and Spleen which heat it. And that it may the more easily compress, and hold together the internal, it hath a threefold sort of strings, which strengthen it to that end; and also when it is slackened with store of Meat, they do contract it again, so soon as the digested Aliment is forced out of the Stomach.

Its Situation. ^a T. 12. f. 2. t. ^b T. 3. f. 4. C. G. ^c T. 3. f. 4. E.

Its Size. It is ^b Scituate between the *Liver*, and the *Spleen*, as it were between two fires, bending a little towards the left *Hypochondrium*, if the Spleen hold its natural bigness; otherwise, when the *Spleen* is bigger than ordinary, it thrusts the Stomach into the middle. ^b T. 2. f. 10. C.

The

The greatness of the *Stomach* cannot be exactly defined, because being empty, and exhaust, if strong, it is so contracted, that it is no bigger than a mans Fist. Being stretched and widened with store of Belly Chear, it wil containe six pints of Drink, with a Pound or two of Meat, as is daily seen in Gluttons, and Toss-Pots.

There is but one *Stomach* in Mankind, which is sometimes divided according to the Longitude into two Cavities; which have their Ingress and Egress, like the *Stomachus*, and *Pylorus*. And such persons do vomit with great difficulty; and when they do, they cast up Excrementitious Humors without that broth which they took the same moment. Shal we say the separating faculty can work so quick, or rather that the broath is slip down into the Lower division of the *Stomach* from whence it cannot easily returne, because of the narrowness of the upper Orifice.

If the *Stomach* be single and rightly shaped, it is of a longish Spherical Figure, and is compared to the Belly of a Bag-Pipe, setting aside the *Oesophagus* and *Guts*.

The *Egress* of the *Stomach* is equal in height unto its *Ingress*; that is to say, the two *Orifices* thereof, are equal in height, least the Meat and Drink should slip through, before they be digested; and then being digested by the strength of the *Stomach* Contracting it self, the *Pylorus* is opened, and the *Chylus* sent into the Gut.

The *Ingress*, or upper *Orifice* of the *Stomach*, is in a special manner termed *Somachus*, being the Seat of *Hunger* and *Thirst*, because it is crowned with two *Nerves*, called *Stomachici Nervi*; and is consequently of an Exquisite sense.

The lower Orifice, is called *Pylorus*; in which you shal observe a *Valve*, round in shape, and as visible and remaikable as the *Valve* in the Gut Colon. This *Valve* is to hinder the *Chyle* from returning back again into the *Stomach*.

Besides these two *Orifices* in the *Stomach*, there is observable its *Bottom*, or Inferior Part, more fleshy than the rest; because therein the Meat is boyled or digested.

The internal surface of the *Stomach* is wrinkled, and stored with fibres, that it may thereby retain what is taken in for nourishment.

T. 3. f. 2. H. f. 4. A. f. 2. F. G. f. 2. K. f. 4. B. f. 2. III. f. 4. E.

The Action of the *Stomach* is the *Cotion* of Aliments; which though they be many, and of divers kinds; yet the *Stomach*, by a propriety, or inbred faculty which it has, does dissolve, and as it were melt them, and turne them into a substance like *Crema*; which is called *Chylus*. How that is done, I have already examined in my *Anthropographia*; and in my Answer to *Wallæus*, a very learned Physitian of *Leyden*.

The *Stomach* has *Communion*, by reason of neighbour hood, with the *Liver*, the *Gal*, the *Spleen*, the *Sweet-bread*, the uppermost *Guts*, the upper Part of the *Mesentery*; and also by the veins which it has from the Trunk of *Vena Porta*, and the *Splenical Branch*. It Communicates also with the *Heart* and *Lungs*, by the *Stomachical Nerves*; of which some Part is Communicated to the *Heart* and *Lungs*: it Communicates also with the *Brain*, by the *Stomachical Nerves*, which proceed from the *first Conjugation*.

It does chiefly Sympathise with the *Kidneys*, when they are misaffected, either by want of Appetite, or by frequent Vomiting, by reason of a complication of the *Costal* and *Stomachical Nerves*, disposed between the two *Kidneys*. From whence are derived Nerves, that are dispersed into all Parts of the Belly.

By reason of its Nervous substance, it has *Communion* with the whol Body; whence it is the in the Disease *Cholera*, the *Ancles* are contracted; & there is anxiety and Unquietness of the whol Body, when the *Stomach* is disordered.

Number.

Figure.

Two Orifices.

The upper.

The Lower.

Its Bottom.

Inner Surface.

Action.

Digestion how caused.

Communion with other parts.

Great Sympathy with the Kidneys.

Communion with the whol Body.

The

The Medicinal Consideration.

- Stomachs Distemper.** The Stomach is afflicted with diverse Diseases, *Similar, Organick, and Common*. For it is troubled with a Simple, or Compound distemper, while it is over cooled, over heated, over-dried, or over-moistened: of which, *Galen* discourses accurately, in the seventh of his Method.
- Inflammation.** Also, it is Inflamed, *Impostumated*, and *Ulcerated*; and these three happen chiefly in the upper, or lower *Orifices*, because of their fleshyness: sometimes they may happen in the bottom, which is wounded, and healed; yea, and can bear incision, that any Iron, or other hard thing which hurts the Stomach may be taken out, when it cannot otherwise be voided, either upward or down ward: as we read in that story of a *Prusian*, who had swallowed a Knife.
- Burning.** *Hippocrates* observed a burning Heat about the Stomach, in his Aphorismes: which is dangerous, by reason of Cholered between the Coates of the Stomach; or by reason of the neighbouring Parts burning, and Inflamed.
- Bred by the Gall.** Sometimes the Gall touches those Parts of the Stomach which are next it, and scorches the same, as if it were burnt with a Fire brand red hot.
- Distended.** It is also troubled with Diseases of *Magnitude, Increased or Diminished; Diseases in Scituation, in Cavity, in Figure, and in Smoothness.*
- Straitned.** The *Magnitude* of the Stomach, *Augmented*, and *Widened*, as in Gluttons, does over much stretch the Stomach, and loosen its Fibres. So that afterwards, it cannot be sufficiently contracted to imbrace the Meat in such sort, as to turn the same into good *Chylus*: which is the Cause of crudity, and weakness in the Stomach.
- widened and slackned.** And when the *Substance* thereof is so streightned, through dryness or Swelling of the Membranes, that it cannot sufficiently widen it self to contain the Meat; then is it pained after Eating, though but a little Meat be taken.
- Changes posture.** But the Stomach is more frequently Diseased by *Dilatation*, and *Exolution*, or *Flaggyness*, and *Slapness*, both in persons otherwise in health, and such as are sick; while with Broaths and plenty of cold drink the *Tone* or contractive vigor of the Stomach, is so dissolved, that a looseness of the Belly is thereby caused: which is attributed to the Corruption of the Meat through an hot distemper of the Stomach; or to the Obstruction of the *Mesaraick Veins*: which Symptome, notwithstanding, is often Caused by the over great *Laxity* of the Stomach, which *Fernelius* calls *Morbum Materiae* a Disease in the matter; and it must be Cured with strengthening and astringent things. This has been observed in the opening of dead Bodies, where the Stomach is found so extended, and so widened, that it would contain the Head of an Infant. And therefore it is very necessary for a Practitioner to observe the Diseases of the Matter, which are Cured with drying and astringent things, both given in, and applied outwardly. This was the Doctrine of that sect of Antient Physitians, which were termed *Methodici*, who made *Laxity*, and *Astriction*, the Cheife things observable in all Diseases.
- Obstructed.** Sometime the Stomach changes its natural Scituation, and is drawn back towards the *Midrise*, which Causes shortness of Breath after Meales. Sometimes it hangs down as low as the *Navel*, as has been observed in Bodies dissected, which makes a bad life, and a bad *Concoction*.
- Made smooth.** It is obstructed when its upper, or lower *Orifice*, is troubled with some swelling, which hinders the coming in of Nutriment into the stomach, and its going out after digestion.
- It is also Diseased with *Smoothness*, when the *Inner Surface*, which naturally should be wrinkled, is become smooth, which Causes that symptome which is termed *Lienteria*, which is, when there is such looseness of the Belly, that the Meat comes away unchanged, just as it was Eaten.

T. 3. f. 2. FG. f. 8. III. 2. T. 3. f. 8. V.

Divers Symptomes infect the *Stomach* in respect of its *Action* being hurt, and in regard of the disorder of such things as are Evacuated therefrom. The *Action* of the *Stomach* is, *Appetite*, *Concoction* and *Chylification*. The *Appetite* is hurt, when it is *Abolished*, *Diminished*, or *Depraved*. It is *Abolished*, when there is no *Stomach* or *Appetite*, or when *Meat* is loathed, especially *flesh*, which is the worst. *Appetite* is often *Diminished* in *Diseases*, which is not so bad. But the *Depravation* of *Appetite* is worse.

Action Hurt.

want of Appetite.

Now it is *depraved*, when there is a *Dog-like Appetite* which cannot be satisfied; or when evil things are desired; which kind of *depraved Appetite*, *Pliny* termes *Malacia*; and *Galen*, cally it *Citta*; in *Latin* *Pica*, the *Mag-pie*. *Chylification* *Abolished*, or *Diminished*, is called, *Apepsia*, *Inconcoction*; and by vulgar *Physitians*, *Corruptio Chyli*, a corruption of the *Chyle*. When *Meat* is long in digestion, tis called *Bradupepsia*, slow Digestion. When the *Meat* is corrupted, its called *Dyspepsia*, ill digestion.

Dog appetite. Absurd longings.

Indigestion. Slow digestion. Ill digestion.

To *Action hurt*, belong the *Feeling*, *Motion*, and *Pain* of the *Stomach*. There is feeling in the whol *Stomach*, but it is exquisite in the upper *Orifice*, by reason of certain *Nerves* of the *Six Pare*, which are there interwoven with admirable workmanship.

Feeling, is *Abolished*, and *Diminished*, when there is need of *hungring* and *thirsting*, and yet the *Stomach* perceives it not, but refuses both *Meat* and *drink*. This proceeds from a great distemper of *Heat*, or *Cold*; which causes *Mortification*, unless the *Patient* be distracted.

Refusing Meat.

The sense of feeling is *depraved* in the *Pain* of the whol *Stomach*, or of the upper *Orifice* thereof, which drawes the *Heart* and noble *Parts* to *Sympathise* therewith: wherefore this pain of the *Stomach*, is called *Cardiognos*, *Cardialgia* and the aking of the *Heart*, or *Heart-burning*; and causes that kind of swooning, which is called *Syncope Stomachica*, the *Stomach* swooning; and comes through the *Hearts* *Sympathizing* with the *Stomach*.

Heart-burning

And to this *Pain* of the *Stomach*, belongs *Anxiety*, and *Unquiet tumblings* and *tossings*; which the *Greekes* terme *Riptasmos*, or *Asse*; from whence the *Feaver* *Affoder*, has its Name; in which the *Sick* are full of *unquietness*.

Anxiety.

The motion of the *Stomach*, is *Relaxation*, *Coarctation*; By the latter, it shuts it self upon the *Meat* to digest the same, and when that motion failes, there is nothing but *fluctuations*, and *risings*, both when a man is full and fasting.

want of Coarctation upon the Meat.

The motion of the *Stomach* is *depraved* in *Hiccupings*, and *Belchings*. *Hiccuping* is more trouble some then *Belching*, and is an ill sign in *feavers*, whether it come by fault of the *Stomach* it self, or by its *Sympathizing* with some other *Part*, especially the *Liver*. *Hippocrates* mentions a *Disease* called *Morbis Ructuosus*, the *Belching* *Disease*.

Hiccuping. Belching.

Disorders in point of *Excretion* are frequent in the *Stomach*; either upwards, in *Vomitings*, and *Spawlings*; or downwards, in the *Lienteria*, *Diarrhea*, and *Coeliaca Affectio*.

Symptomes in excretion are.

Vomiting happens, either by reason of *obstruction* of the upper, or of the lower *Orifice*; if the upper be obstructed, the *Meat* is stopped in the upper *Orifice* a while, and presently after *Vomited*: if the fault be in the lower, the *Meat* is retained a longer time, and at last *Vomited* up.

Vomiting.

A daily *Vomiting* up of *Choler*, without further trouble, is no *Disease*, nor ill *Symptome*; because it happens by reason that a branch of the *Choler* carrying *Vessel*, is carryed into the *Stomach*; as *Galen* observes and proves by examples.

Of Choler.

Vomiting of *Blood* is an evil *Symptome*, whether the *Blood* flow from the *Liver*, by the *Veins* which are branched from the *porta*, into the *Stomach*; or from the *Spleen* by the *Var Breve*. Sometime the *Patient's* life is *Vomited* up this waies, according to that exprellion of a *Poet*.

Of Blood.

Out of his Mouth, he spewes his Purple Soul.

h. Tab. 4. Fig. 8. let. b. 2

The

of wind. The frequent breaking up of wind with Belching, may be reduced to this Symptome of Vomiting; and this may be that which is termed *Cholera Sicca*, known to *Hippocrates*, and declared with its signs, by *Ludovicus Duretus* in his Comment upon the Coick Prædictions of *Hippocrates*.

Of choler up and down. But there is a Malignant Symptome, called *Cholera humida*, which is a violent, and plentyful voiding of Choler upwards and downwards, which kills within four daies; because very much Evacuation suddenly caused, is dangerous. *Hip.* 1. Book of Aphorismes; and an excess is an Enemy to Nature, according to the same *Hippocrates*. It proceeds from an Inflammation of the Stomach, which is allayed by cooling and astringent Remedies, inwardly taken, and outwardly applied, but especially by the drinking of the spaw Waters, and other Medicinal springs of the like Nature; and by Laudanum discreetly given. We must avoid the use of cordial, and Stomach Pouders of an hot Nature, because they vex and fret the Stomach. The Physicians of *Paris* do let Blood, in a small Quantity, though the pulse be very weak, least the Stomach Heat being suffocated, a Gangrene should arise.

2. *Spawling.* Spawling, or Salivation, unless it be caused by anointing the Body with Quick-silver (which they call *Fluxing*) comes either from the Brain, or else (and that oftentimes) from the Spleen, whose superfluous serosity is received into the Stomach and voided at the Mouth by spitting and spawling.

Morbus Cardiacus. The *Cardiacus Morbus* belongs to the Diseases of the Stomach; of which, read *Trallianus Lib. 3. Chap. 5. 25.* And *Mercurialis in Varj's Lectionibus*. 'Twas knowingly said of *Seneca* in his 13. Epistle; *Bibere et sudare Vita Cardiaci est*; drinking and sweating, is the Life of a Cardiacal Person. *Pliny*, in his 23. Book, *Cap. 1.* of his Natural History, saies, that all Hope of Curing this Disease consists in the use of wine. Which he borrows from *Varro*, out of the 14. Chap. of the 13. Book. This *Morbus Cardiacus*, is an extreme Faintness of the Stomach, joyned with much sweating: it proceeds from an hot Distemper thereof.

Rumination. Among Diseases of the Stomach Rumination ought to be reckoned, which is an inversion or turning of the Stomach, as it were Inside out, which in some Living Creatures is no trouble, as in those that chew the Cud. Of this Disease see what *Horstius* saies in his Epistles.

Vomits warily to be used. Out of this Anatomical and Pathological Discourse may be collected, what parts are purged through the Stomach by way of Vomit: whether it be safe to exagitate this Part by Violent Vomits: whether it be good to use a mans self to this kind of Evacuation; seeing no good Huswife makes a Close-stool of her Pottage-Pot. The best way is, diligently to preserve the Stomach, and to Roborate its Tone or contractive Vigor, rather than to dissolve and slacken the same by Vomiting, unless Nature desire to discharge herself that way, and the patient be easie to vomit, and such preparatives be premised as the Antients were wont to use.

Vomits not to be given to persons very weak. Wherefore they deal unskilfully, not to say wickedly, who after many other Medicines tried, do give vomits to such as are at Deaths door, as the last help, which suffocate that little life which remains, and bring a speedy death. But some will say that *Empericks* and *Mountebanks*, do this with good success. I answer, if you should reckon up those patients who have taken them to their cost, you would find an hundred dead, for two robustions persons saved; who scaped by their good fortune, not by help of the vomiting Medicament: it is better to use vomits rather at the beginnings of Diseases, while Choler works and ferments in places near the Stomach, than when the Pangs of Death have seized upon the Patient. 'Tis Man slaughter, to wrong People in their health. The discreeter sort of *Empericks*, when they are called to such Patients, are wont to find fault with what other Physicians have acted, and to declare the Patient dangerously sick, and there upon, warily to give their *Aurum Potabile* or some such other Medicine as a cordial and restorer of strength, until Nature being freed from all disturbance of Physick, begins to gather strength: and then they take opportunity to give a gentle Vomit which Purges

serous

ferous, or such like Excrements, up and down. In very many Diseases, Hippocrates saies, 'tis better to be quiet, than to do any thing; that is, 'tis better to leave the work to Nature, than to give any Medicament. And if the Physician knew that he is the Servant and Assistant of Nature, he would cure more Patients than he does. See *Valesius* upon the 19. Text of Sect. 2. of the 6. Book of Hippocrates Epidemics.

Sluggishness of the Belly, and impurity of the Vessels, brings al into confusion. Hippocrates.

Chap. 24. Of the Liver.

THE Liver, which is the Instrument of making Blood, consists of a Substance proper to it self, fitted, and ordained to that end; for it is like congealed blood, and therefore red, and the same color it imprints upon the blood; howbeit the Liver of some Fishes, is of another Color, viz. green, black, yellow as Saffron; in which Creatures, the blood receives its red color by passing through the substance of the Heart.

But in Men, and other living Creatures, which have the two Veins distinct, called *Porta*, and *Cava*, the whol Mass of blood is wrought in the Liver; but one part thereof, less perfect than the rest, is by the *Vena Porta* distributed among those Parts which serve to nourish the Body; another part being conveyed by the *Vena Cava*, is perfected in the Heart, of which is made the Arterial blood, which is distributed to al the parts, and afterwards is transmitted into the Veins, that so in a Circular motion, it may pass again into the Heart, that by its flux, it may maintain the perpetual motion of the Heart; as the Wheels of a Mil, are continually turned about by force of the Wind, or Water-fal.

Such blood is furnished to those parts, which having sence and motion, depend upon the Brain or Heart.

The Liver is ^a situate in the right Hypochondrium, under the bastard, or short Ribs, and fills with its bulk, al that Cavity to the Sword-like Cartilage. Sometimes it is so enlarged, as to exceed those Natural Bounds, and then it rests upon the Stomach, reaching as far as the Spleen, and descends three or four fingers breadth below the bastard, or short Ribs: which happens, partly through relaxation of the bands wherewith it is bound to the Midriff, and short Ribs, partly through swelling of the Liver it self, over loaded with Nutriment.

In Man-kind, there is one single Liver, which is not divided into Lobes, or Fingers, as in brut Beasts; yet there is a certain ^b Cleft to be seen, where the Umbilical Vein creeps into the Liver; and many times two little Lobes, or Laps, are ^d seated under the greater ones: sometimes there is only ^e one, which being hollowed, receives the Trunk of *Vena Porta*, which is included in a Duplication of the Omentum, or Call, that the Excrements of the Liver might be derived thither.

Although the Liver be one continued Substance, yet Anatomists divide the same into two Regions; the one superior, and exterior; the other inferior, and internal. The superior, or upper, is called the ^g Gibbous, or bunching part of the Liver: the inferior is called the ^h hollow part of the Liver. Into the upper Region, the *Vena Cava* sprinkles its Roots: into the nether Region, the *Vena Porta* sows abroad its Suckers.

Besides these Roots, there are observable, certain Branches of the Channel of Choler, dispersed among the Roots of *Vena Porta*; and certain little twigs of the Milky Veins, which neer the Trunk of *Porta*, do enter into the Cavity of the Liver.

^a T. 2. f. 10. 1. D. T. 4. f. 1. A. B. ^b T. 4. f. 5. C. ^c f. 1. a. f. 5. E. T. 2. f. 10. G. ^d T. 4. f. 4. A. A. ^e f. 5. B. ^f f. 5. I. ^g f. 1. B. f. 4. A. A. ^h f. 1. A. f. A. A. ⁱ f. 4. D. D. ^k f. 5. I. & c. ^l f. 15. H. ^m T. 9. f. 1. a a a a.

Diversity of the Regions, to be observed in practice.

It is the mind of Physicians, that both these Regions ought diligently to be observed, because in either of these Regions, the morbidick matter may be contained, which is diversly to be purged, according as it possesses the one or other Region: for as much as the bunching part of the Liver, is purged by the Kidneys, through the *Vena Cava*, the hollow part is purged by the Guts, by means of the Branches of *Porta*, which are terminated in the Guts, conveying blood, and the evil humors of the Liver. I have seen Impostumes in the bunching part, when the hollow part has not been at all tainted: and on the other side, I have seen the hollow part impostumated, without any detriment to the bunching part.

Howbeit, inasmuch as I cannot see those two Regions separated so much as by a Membrane; I cannot believe that one part can be sick, and the other sound, unless the morbidick humor be contained within the Pipes of the little Veins.

Whether the Roots of Cava and Porta, are united in the liver.

Many Anatomists do affirm, that the Roots of *Vena Cava*, and *Vena Porta*, do meet together, and are united one unto another by many Anastomoses: others deny that there is any such Conjunction; among which, I willingly acknowledge my self for one, and give my voice on their side: my Reasons I have elsewhere laid down, and Nature would have it so, that natural, and vicious Humors might not be confusedly jumbled together in the Liver.

How blood is distributed from the Liver

You shall observe, how the Vein which is taken for *Cava*, takes its rise out of the upper part of the Liver, and is inserted into the Trunk of *Cava*, near the midriff, that the *Cava* may forthwith pour out the blood which it hath received from the Liver, or rather transmit the same into the neighboring Heart, situate only two or three fingers breadths off, and inclosed in the *Pericardium*, which cleaveth circularly to the Nervous Centre of the *Diaphragma*: whereby thou maiest perceive, that the greater part of the blood, goes into the right Ventricle of the Heart, that it may become Arterial, by a double Circulation, Particular, and General.

A double Circulation of the blood.

I call that the particular Circulation, which is made from the right Ventricle of the Heart through the midst of the Lungs, so as that the blood comes again into the left Ventricle of the Heart. The general Circulation, is that which is made through the Channels, or large Pipes of the *Cava*, and the *Aorta*, after that manner which is described in my Treatise of the Circulation of the Blood.

The Medicinal Consideration.

Diseases of the liver in respect of

Temper.

Substance.

Situation.

The Liver being affected contrary to Nature, is subject to any distemper, either with, or without matter; and instead of good blood, it breeds that which is Chole-
rick, Flegmatick, or Melanchollick. It is altered, and corrupted in its substance, while it loses its Tone, and becomes flaggy, and faint.

It changes its Situation, when it is placed in the left side, and the Spleen on the right, which seldom happens: or when upon the slackning of those Ligaments wherewith it is fastened to the Midriff, and Sword-like Cartilage, it sinks below the short Ribs, as far as to the Navel.

Magnitude.

Its Magnitude is changed, when it is so over-charged with Humors that it swells again.

Shape.

Its Figure, or Shape, is also changed, if we feel it to be round. Oftentimes its passages are stopt, namely, the Roots of the *Cava*, and *Porta*; or the Roots of the Gall-Bladder are stopt, though the other be open.

Communion with other parts.

It has communion in regard of Neighborhood, with many parts which it touches, but especially with the Stomach, which it often harms, being inflamed, or impostumated: and sometimes it exulcerates the same, and makes an hole therein, to empty its self that way of its Quittor. With its hollow part, it touches the Guts, which are offended in Diseases of the Liver; and also the *Peritoneum* it self, by reason of the Coate which it imparts, and the Midriff, by reason of the firm Connexion they have with the Liver, are drawn to sympathize in its Diseases.

Action.

The Action of the Liver, which is Sanguification, or Blood-making, is hurt by the fore-recited Diseases: whereupon divers Diseases, and divers Pains do arise.

Wherefore

Wherefore the Similary Diseases of the Liver are al Distempers, and the Laxity thereof, from which some are termed *Hepatici*, who having a looseness do void Excrementitious Blood, like the Water in which Raw flesh has been washt, or Excrementitious Humors of bad and diverse Colors.

Its Similar Diseases.

Its Organick Disease is obstruction. Its Disease common to the Similar and Organick Parts, is an Ulcer and a wound. Its Compound Disease is al sort of Tumors, whence comes the Term of Inflammation of the Liver. also a scirrhus and a purulent Impostum, which is frequent enough.

Its Organick, Common, and Compound Diseases.

Its Symptomes are, Action hurt, and that manifold: and first of all, its attraction of Chyle being abolished; breeds a looseness of the Belly, in which Chyle is voided. Its Retention abolished, breeds the Liver looseness called *Diarrhea Hepatica*. But the Principal Action of the Liver, viz. Sanguification or Blood-boiling is abolished in the Dropsie, is diminished in *Atrophia*, and is depraved in *Cachexia*.

Its Symptoms.

The Dropsie is defined to be, a frustration of Sanguification in the Liver, when in stead of blood or natural spirit, it produces nothing but Water and Wind, which are emptied forth into the Belly, whence come the *Ascites* and *Tympanites*, that is the Bottle-bellied, and the Drum-bellied Dropsie; or else they are conveyed into the Habit of the body, whence comes the Dropsie *Anasarca* and *Empneumatosis*, viz. The Bloat-fac'd, Puf-Cheek'd Dropsie. Somtimes a Dropsie is caused through fault of the Spleen and other Parts, but not without the Liver be hurt, and likewise the heart, by means of the *Circulation* of the blood.

Dropsie.

Atrophia (or falling away of flesh) is an hindrance of the bodies nourishment, by reason of the badness of the blood which the Liver Makes.

Atrophy.

Cachexia is a depraved kind of Nourishment, by reason of bad Sanguification. Before these, is wont to march a simple accident, viz. Badness of Color in the Skin, either blewish white, or Yellow, by reason of Serosity or Choler shed into the Habit of the whol Body, even as far as the face, by which we discern the evil dispositions of the Liver.

Cachexy.

Chap. 25. Of the Bladder of Gall.

Now follows the *Folliculus Felleus*, or *Cystis Billiaria*, the Bladder which is ordained to containe that Excrementitious Choler which flowes from the Liver.

Its Name.

Its substance is Membranous, being distinguished into two Coates.

Substance. Scituation.

It is placed under the Liver, & affixed to the greater Lobe or lap thereof, and as it were, overwhelmed therein.

The bottom of the Gal Bladder respects the inferior Parts, Its Neck, the superior parts, and a pipe derived from the Gall-Bladder called *Canalis Cysticus*, is carried obliquely til it meet the *Canalis Hepaticus*. There is a *Sinus*, or bending neer the Orifice of the Bladder,

Bottom. Neck. Sinus.

Its Magnitude varies according to the plenty or Scarfity of Choler, It is only one. It has been found somtime double, but that was contrary to the intention of nature. It's divided into the bottom, which is the lower Part, and into the Neck which is the upper Part.

Bigneß. Number.

It has an oblong shape resembling a large Pear, broad at the bottom and straiter towards the Neck.

Shape.

It is hollow that it may receive Choler, and retaine it til a convenient time of emptying the same: is has certaine pipes or Channels to carry Choler: the one broader and longer, drawn out from the Liver to the beginnig of the *Intestinum Jejunum*, that is the Hungry Gut, or Gut termed *Jejunum*, by which the thicker Choler passes directly away; the other Pipe is a smaller and shorter, which is drawn Crois-waies, from the Neck of the bladder, to the foresaid passage. The former I cal *Meatum Hepaticum*, the Liver Channel; the latter I cal *Cysticum Meatum*.

Passages Choler.

Meatus Hepaticus.

Meatus Cysticus, the Bladder passage, by reason of its Rife and Orifice. For the *Meatus Cysticus* carries the thinner Choler into the *Meatus Hepaticus*, which a porous Membrane, full of little holes, rooted in the Liver had suckt therefrom.

And therefore we must observe, that there are two sorts of Choler in the Liver, and two Channels to Purge them away at divers times; which is a Consideration of great moment in the Cure of Diseases.

The Gall Bladder communicates with the Stomach by touching the same, which it heates, so, as sometimes to burn the same, when the Gall Is inflamed in its Bladder. Sometimes it sticks to the Gut Colon which passes along hard by, which it often Colers Yellow, and provokes it to expell the Excrements.

This expurgation of Choler, being liable to be stop't, does vex the body with many Inconveniences.

There is seldom observed a third channel of Choler, which goes into the Stomach, unless some Part creep from the *Meatus Hepaticus* unto the *Pylorus*.

It has manifest Veins from the *Porta* called *Venæ Cysticæ*. Its Arteries and Nerves are not so visible.

^a T. 4. f. 1. C. f. 5. F. ^b f. 5. H. H. f. 3. c. ^c f. 3. D. ^a T. 4. f. 8. b. ^c

The Medicinal Consideration.

Diseases of the Gall-Bladder.

THe Gall-Bladder is subject to few Diseases. The most common are, when its Cavity or its Channels are obstructed. When its Cavity is full of little stones, or filled with one great one, by reason of thick Choler changed into a stony substance. Its passages are stopped in the Liver, or in the Gut. Also it is broken, through violent motion in Vomiting; and sometime it is so distended with Choler, when the passages are stopped that should Evacuate the same, that it has been seen as big as both a Mans Fists.

Sometimes, when it is empty of choler, it dries up, so that nothing therefore remains saving the ductus Hepaticus. If we beleive *Fernelius*, there could be no other Cause found of the death of some persons, than that their Gall-Bladder had no Choler in it: if so, the evil and venomous Quality of the suppressed Choler was so great, as to infect the heart; or to weaken and corrupt some noble part.

Its Symptoms.

The Symptoms of this Part are more manifest; which do consist in its action hurt, or in the undue proportion or quantity of the Excrementitious Choler. The Action of the Gall-bladder is attraction of Choler, which is either diminished, or abolished. The undue proportions or quantity of the Choler is, when either too little or too much is voided forth.

Their Signs.

Which Symptoms chiefly appear in those Parts which Sympathise with the Gall-bladder, as in the Stomach, when Choler is vomited up; in the whol body, when Choler is shed abroad through the Veins into the habit of the Body, and deforms the Skin; or when it takes its Course into the Guts and causes a dysentery, or a Cholerick looseness.

Their Original.

But the original of these Symptoms is to be charged upon the Liver, being ill disposed.

And *Democritus* had good Reason to search diligently into the seat and Nature of Choler, when he made dissection of divers living Creatures, that he might be more able rightly to cure the Diseases of Body and mind.

Diversity of Choler proved.

When I see in an extream Yellow Jaundice, the whol Skin infected with Choler, & that the Urins die cloaths Yellow, the stools being in the mean time whitish; And when I see in another sort of Jaundice, both the Urins and stools Yellow; This confirms to me, that there are two sorts of Choler, and several waies for the expurgation of each of them. In the Yellowest sort of Jaundice, in which the stools are

By the different sorts of Jaundice.

whitish, the *Meatus Hepaticus* or Liver passage of Choler is stopped in the Cavity of the Liver. In the other sort of Jaundice when the stools are Yellow, it shews that a quantity of Choler passes away by the Urins and Guts, and the obstruction

struction is not so great nor so stubborn, as in the Yellowist sort of Jaundice, and therefore it is to be hoped the Cure will be more speedy.

Chap. 26. Of the Spleen.

THe Spleen is a Bowel placed right against the Liver, as its Lieutenant, and a kind of Bastard-Liver, that when the Liver is Diseased, it may assist the same in Sanguification or Blood making. *The Spleen described.*

It is of a ^a Substance spongy; soft, sprinkled all over with very many Vessels like *Fibres* or threads; yet it is altogether unlike the substance of the Liver. It is in- *Its Substance.* folded in a Membrane ^b proper to it self, seeing it receives none from the *Peritonæum*.

Its Color is Black and Blew and obscurely Reddish.

Its greatness is uncertaine and not determinable, because it grows greater or less, according to the abundance, or defect of Humors which flow thither, & are collected therein. So that there is none of the Bowels which does so easily grow bigger and lesser, as the Spleen. *Color. Greatness.*

In respect of Number, it is wont to Be single; Sometimes it has been observed to be double and threefold. *Number.*

Consider in the Spleen its upper Part, which is termed the Head, and its nether Part which is called the Taile. *Parts.*

Tis ^a placed in the left *Hypochondrium*, under the short Ribbs, opposed as it were to weigh against the Liver, that the Body might remaine equally balanced. *Situation.*

When it keeps its Natural Constitution, its Temper is hot and moist enclining to dryness. *Temper.*

It is of an oblong shape, like a Tongue, in Brutes; but in Mankind, it is more like the Sole of a Mans Foot. In the fore Part towards the Stomach, it is ^b hollowed, that it might receive the ^c splenical Veins and Arteries, on the back part towards the Ribbs, its ^d bunching. *Shape.*

Its knit into the Stomach by two or three Veines remarkable enough, which do make that so famous ^e *Vas Breve*, so called by reason of the shortness of the way. Through those Veins it disburthens it self into the Stomach: by the Veins and Arteries Splenical, it Purges it self into the Guts and Kidnies. *Connexion.*

It's fastened to the bastard Ribbs by Membranous *Fibres* sufficiently strong: sometimes it's fastened to the Stomach, and is knit at its point to the Midrif or *Diaphragma*.

It Communicates with the Heart, by a remarkable peculiar and admirable Artery which it hath, which by a short way carries thither, the Vapours or il Juyces thereof.

The Action of the Spleen is much doubled and controverted among Physitians and Anatomists: so Many Men, so Many Minds: *Hippocrates* did beleevè that it drew superfluous serosity out of the Stomach: which Opinion *Aristotle* followed, though others draw it to an attraction of Chyle, either out of the Pancreas and Mesentery, or out of the Stomach. *Action controverted, divers Opinions thereof.*

Galen will have it employed in Purging away Melancholy, which it draws from the Liver.

Others are of Opinion that it prepares Blood for the Heart that it may become Arterial, whether it be of the thicker parts of the Chyle, or of the dregs of the Blood carried thither.

Others say it prepares a superfluous wheyish matter, being the excrement of its own digestion, which it sends back again into the Stomach, to ferment the Meats when they are turned into Chyle.

The Arabian Physitians acknowledg such an Humor, but they assigne its office to be the provoking of Appetite. *Galen* thought that it did help to strengthen the Stomach. *In*

In so great dissent of Authors what shal we resolve upon? every one brings probable reasons for his Opinion. *Hofmannus* conceives he has sufficiently established his Opinion, that no wise man can contradict him. Shal I venter my Opinion among so many learned Champions?

The Authors
Opinion.

I conceive that the Spleen does attract slimy Blood to nourish it self, and that it sheds a special kind of fermentative Serosity through the Splenick Arteries into the Stomach; and because its *Tarenchyma* or substance is of a Spongy and soaking Nature, it does by the Veins attract and suck out the superfluous humidity of the Stomach, that the Coction may be the better.

Howbeit, I deny not but that it may by Accident supply the Office of the Liver, when the same hath lost its faculty of Sanguification; but Blood cannot be made so good and perfect in the Spleen as in the Liver, seeing it is but a bastard Liver, and consequently makes but bastard Blood and impure, because not Clarified.

Hofmans Opin-
ion of the
Spleens Sanguifi-
cation exami-
ed.

Hofman makes himself Ridiculous, while he eagerly contends in a little Book which he has put forth, and up and down in his other writings, that the muddy part of the Chylus, is carried by the Mesaraick Arteries unto the Spleen; where it is turned into Blood, with which, the neighbouring Parts are nourished: and that the Excrements of this Blood are voided by Urins, Stool, and Sweat. That good Old Man is to learn, that the thicker Parts of the Chyle are not sucked out, but separated and sent away into the greater Guts; and that the Mesaraick Arteries cannot do as he saies, because they containe Arterial Blood. neither do they reach any of them to the Spleen, because it has a peculiar Artery, which *Arantius* first described, and which I my self have often shown.

Again he ought to have rejected the Milky Veins of *Asellius*, which he allowes of; seeing none of them reach unto the Spleen.

Furthermore, that same bastard and impure Blood, bred of muddy Blood by a bastard Liver, will be unfit to nourish the neighbouring Parts which serve for Coction, though they appear filthy, for they need to be nourished with pure Blood for their preservation.

The Cholerick, Melancholick and Wheyish Excrements of the said Blood, cannot be Purged away but by Veins and Arteries; the Arteries are already taken up with carrying the muddy Parts of the Chyle. They must therefore of necessity be carried by the Splenick Vein into the liver, that they may be voided through the Guts or by the Kidnies, which would breed very great confusion in the Liver.

If *Hofman* had considered, that the substance of the Spleen is unlike the substance of the Liver, its bigness different, its number uncertain, Color divers, Situation variable, because sometimes it sinkes down to the *Hypogastrium*, more often ascends towards the Midrif, sometimes descends upon the left Kidney, the Ligaments being slackned: and lastly, its shape, quite contrary to that of the Liver, and sometimes there is no Spleen at all: also that the structure of the Vessels of the Spleen, is altogether unlike that of the Vessels of the Liver; he would never have so stiffly affirmed, that that the Spleen made a peculiar kind of Blood out of the Chylus.

Nature does in none of the Bowels more sport her self, than in her shaping of the Spleen so variously and unconstantly. But the Structure of those Bowels which are necessary to the maintenance of life, is allwaies, one and the same and uniform.

Furthermore you may know that the substance of the Liver & spleen are unlike, by boyling the one and the other: for the substance of the Liver is firme, solid and Reddish; that of the Spleen is Spungy, soft, and black and blue in Color: The substance of the Liver of Animals boiled, as of an Ox, a Sheep, a Goat, is eaten with content: the substance of the Spleen is not Mans meat, neither will other Creatures eat it, unless they be very hungry. But if the Office of the Spleen and Liver were the same in Bruts as wel as in Men, they should have both alike substance, and breed the same blood.

Where

Where will you find a place to cleanse away Choler in the Spleen, as their is in the Liver? If the Spleen draw the more thick Part of the Chyle, it ought to have larger Veins, but they are exceeding smal, like unto threads. Wherefore *Hofman* does foolishly to enquire the *Dioti* or *Cause why it is so*, before he knows the *Hoti*, that it is so, which ought to go before, and be diligently enquired into, when the natural Action of Parts is sought after, because the natural Constitution is Compounded and accommodated thereunto. What cannot an ingenious Wit imagine? But al such speculations are ridiculous and void, unless they are approved by the Eye, and confirmed by diligent Section and Inspection of Bodies. See *Aristotle* in the third book of his Politicks, at the beginning of the 8. Chapter, who wil there instruct thee.

If *Hofman* had known out of *Aristotle*, that such living Creatures as drink, have a Spleen, Reins and Bladder, he had more truly expounded that passage of *Aristotle* out of *Hippocrates*, of the true sence whereof he glories. The Spleen drawes out of the Belly superfluous humidities, it self being constituted of blood.

^a T. 4. f. 7. C. ^b f. 7. B. B. ^a T. 4. f. 1. D. ^b T. 4. f. 8. A. A. A. ^c T. 4. f. 1. I. 1. f. 8 B. and C. ^d T. 4. f. 7. A. ^e T. 4. f. 6. b.

The Medicinal Consideration.

The Substance of the Spleen is liable to all kinds of Distemper, and to divers swellings, especially that kind of hard swelling which is termed *Scirrhus*. Sometimes it is inflamed, and then the substance thereof is perceived to pant, by reason of the Multitude of Arteries, of which it is full. It seldom impostumates. Its Coat does oftentimes grow thick and becomes Cartilaginous.

It often grows great by abundance of Humors, and grows smal again, sometime of it self, and sometime by use of Medicines. It is better that the Spleen be smal, than great.

A double or triple Spleen is not good, because it is a fault in the Conformation.

The Scituation of the Spleen is sometimes changed, when its Ligaments being slackened, its weight bears it downwards, or they being broke, it falls into the *Hypogastrium* or Parts beneath the Navel; and then it deceiveth unskilful and heedless Physicians, who in Women take it for a Mole, or for a *Scirrhus* Tumor of the Womb; and in Men for a sort of Glandulous Tumor which lies hid in the Mesentery. In four patients it has been my hap to see the Spleen on this manner fallen down into the Belly.

Sometimes one or other of the Kidnies is seen to fall down in the same manner: but it is easie to know the one from the other. When the Kidney is fallen, the swelling is round: when the Spleen is fallen the Tumor is oblong and an emprinels is perceived on the left side under the short Ribbs. And if the Tumor be movable, as it is at first, the Spleen or Kidney is easily reduced unto its Natural place: otherwise, after the space of six months, it sticks so fast to the *Peritoneum* before, to the bottom of the Bladder, to the Guts, and in Women to the Womb, that it must of necessity putrifie in that place; which it wil the sooner do, if either you give the patient Emollient Medicines inwardly or apply them outwardly. If you would prolong the patients life, you must often let blood, and beare up the Tumor with a truss or Swathe band.

What if the Spleen fall from its natural place, shal we sear and burn it with a red hot Iron? when it slips into the Belly shal we take that Course with it? It is a ticklish and dangerous peice of work, notwithstanding Old Farriers or Horse Doctors have written, that the Spleen has been by that means consumed in Horses; and in some poor slaves on whom they durst Experiment so cruel a Remedy.

Much more dangerous it is by opening the left Hypochondrium to take away the Spleen; neither can its thick superfluous Humors be safely dissolved by beating the same.

Diseases of the Spleen in Sub-stance.

Magnitude.

Number.

Scituation.

Difference of the Spleen and Kidney when fallen.

The Cure of both.

same. I should by such a practise fear a contusion, after which an incurable sup-
puration of the whol substance would undoubtedly follow.

Figure.

There is none of the Bowels which in Diseases does more change its shape. Som-
time its long, sometime four square, sometimes round, according as it finds room to
dilate it self in.

Communion.

when it rests upon the Stomach, it does much hurt and disturbe the action there-
of; and if it be fastened to the Midriff, is oppresses the same, or if it reach thither
in its Bulk, it hinders the free *Motions* thereof.

Obstructed,
what Diseases
it Causes.

Upon the Spleen obstructed depend the Black Jaundice, Hypochondriacal Me-
lancholy, the ill Colors of Virgins and other Women, The Scurvy, or *Hippocrates*
his great Spleens, out of which flowes a Malignant Wheyish Humor, which being
spread into divers Parts of the Body, does in the Mouth cause *Stomacace* or *Oscedo* a
forenes with loosness of the Teeth &c. In the Thighs *Scelotyrbe* a forenes with
spots, and wandring pains through the whol body, which are either fixed and a-
biding in certain Parts, which we cal Rheumatismes, and the Germans refer them
to the scurvy, as may be seen in such German Authors as have written of the Scurvy,
especially in the Treatise of *Engalenus*. And therefore after universal Remedies, they
use other appropriate Scorbuticks, which are destined to the Cure of that Disease.

Chap. 27. *Of the Vena Cava and Aorta, within the Lower Belly.*

Liver is not
the Original of
Vena Cava.

THE Trunk of the *Vena Cava* is commonly reported to arise out of the Liver,
and to be divided into the superior and inferior Trunk, as if they were separa-
ted, as it is in the stock of the *Aorta* springing out of the Heart: but Ocular In-
spection does demonstrate, that the Trunk of *Vena Cava* is separated from the Li-
ver, which creepes beneath, and that near the top of the Liver by the Midriff it re-
ceives a branch which grows out of the *Substance* of the Liver, which carries blood
into the Trunk of the *Cava*, that it may be carryed unto the Heart with other blood
which ascends by Circulation.

Wherefore that same Trunk of the *Vena Cava*, is extended al along without
Interruption from the *Jugulum* or Neck even to the *Os Sacrum*. There
I make account is the Cistern of Blood, because a great part of the Blood is contained
therein.

Vena Cava
divided into
Trunks.

The Trunk of *Vena Cava*, in regard of the Liver, which by a branch supplies it
with Blood, may be divided into the upper and lower *Trunk*. The inferior
produces the *Vena Adepofa*, which is disperled into the fatty Membrane of the
Kidney; and then the *emulgent*, which is distributed into the Kidney: after that
the *Spermatick Vein*, whose right-side branch springs from the Trunk of *Cava*,
and its left from the *Emulgent*; finally, it sends three or four branches called *Lum-
bares* into the Loins, which are spread abroad unto the Marrow of the Back.

Distribution
of the inferior
Trunk.

When the Trunk is come to the top of *Os Sacrum*, it is divided into two Chan-
nels or Pipes, which from their Scituation are termed *Canales Iliaci*, the Iliack
Pipes. From these on either hand are produced other Veins, especially the *Sacra*,
Hypogastrica, *Amplissima* *Epigastrica*, and *Pudenda*. In Women, the
Hypogastrica, is longer than in Men, and Nourishes more Parts, and holds the Men-
strual blood, till the time come that it must be voided. Wherefore blood is con-
tained in greater plenty about the Genitals of Women, than of Men.

The *Epigastrica* is observed to be two-fould in Women; the one ascends
into the *Musculus Rectus*, the other opposite thereunto, descends as low as the
Womb.

Seat of Fea-
vers continual
and Intermit-
tent.

In this Trunk of *Vena Cava*, *Fernelius* after *Galen*, placed the seat of continual
Feavers, supposing the Blood rested quietly therein: but seeing the blood is in
perpetual motion, I make the seat of continual feavers to be in the Trunk of the
Vena Cava, and in those great Pipes carryed along through the Limbs; as the
seminary

seminary of intermittent Feavers or Agues, is in the *Vena Porta*, or in the Bowells, which are nourished thereby.

Seeing the Veins are the Vessels and Cisterns to contain the blood, they have a thin coat, saying that the Trunk of *Vena Cava* has a thicker and stronger coat than ordinary, to avoid breaking, in case the blood should work or boyl therein, which by means of the tenderness of the Coat, can sweat and breath thorough. *why Cava has a thick Coat.*

Tis a Question, whether the Veins have *Fibres* or no? Some say yea, and some no. But seeing the Blood is thrust forward by the Spirits and Heat, it has a natural ascent unto the Heart; and therefore it needs no *Fibres* to draw it, and if any were necessary, the right ones would suffice, but the circular ones are interposed for strength, and some threds are observed in the Coat of a Vein, not to draw, but to strengthen the Coat. Wherefore the Contentions about the *Fibres* of Veins are but Vain Janglings; neither are we in Blood-letting so carefully and scrupulously to observe the rectitude of the *Fibres*, as the Situation of the Part affected. *whether Veins have Fibres.*

Hippocrates in his Book *de Morbo Sacro*, does Elegantly call the Veins *Spiracula Corporis*, the Wind-doors or Breathing places of the Body; because when they are opened, a Fuliginous or sooty Spirit Issues out with the Blood, and the Air is likewise by them received in, to Cool the Body. *why the Veins are called the Bodies Wind-Doors.*

In Ancient times, and the daies of Yore, it was a Part of Spoth saying, to view the blood which flowed from their sacrifices, which if it appeared pure and laudable, it was a token of happy and joyful success; if bad and corrupted, it was an ill sign, according to *Lucan*.

*Nec Cruor emicuit solitus, sed Vulnere Largo
Effluxit nigrum rutilo pro sanguine Virus.*

That is,

No usual Blood did spring from the large Wound,
But black and Venemous, for Red and sound.

The Medicinal Consideration.

Seeing the Veins are the Cisterns of blood, it comes here to be considered how the blood ought to be qualified in sound bodies, that so we may be able to judg of that which is corrupt. Now in bodies that are healthy the blood is Red, *Fibrous*, and has a smal quantity of Wheyish Water mingled with it. *The conditions of good Blood.*

Whether the *Fibres* are made of an earthy and flegmatick matter which is drawn out into threds within the Channels or greater Veins, and is made smaller in the lesser Veins, many doubt, supposing the four Humors to be contained in the Mass of blood. Some admit of blood, but severed from the other Humors, which in the first Region are separated from the blood. Others distinguish the Alimentary Humors from the Excrementitious: the former are confused and mingled with the Blood, the latter are to be seen collected in several Parts, as Choler in the Gall-bladder; Melancholy in the Spleen; and Flegm is diffused through al the Parts of the Region of the belly, notwithstanding *Hippocrates* acknowledged two fountains of Flegm, the Head and the Stomach. *How the Fibres in the Blood are bred.*

Now the Quality or temper of blood is hot and moist. Its Quantity cannot be defined. The Arabian Physicians, especially *Avicenna*, do write, that in a Sanguine body well constituted, there are twenty four pounds of blood, so that a Man may bleed twenty pounds and live: but if he bleed more, Death follows inevitably. That which preserves our life, is likewise the occasion of Death: for as good Blood in a moderate quantity preserves our life, so the same being vitiated, or too much in quantity, is the Cause of Sicknels and Death it self. *The natural Temper of the Blood.*

When blood offends in quality, it is termed *Cacochymia*, when in quantity, it's called *Plethora*. Sometime the blood is corrupted and not the Serum or Wheyish Water, Sometime the serum is corrupt and the blood remains sound. Now the serum or Wheyish Water being corrupted, is the worst Humor in the body, *Cacochymia & Plethora, what they are.*

grievously infecting, weakening, and destroying such parts as are therewith diseased.

Some Practitioners do make it a Question, Whether in the Veins, every Corruption of Humor has its own proper Serum or not. I believe that there is but one kind of Serum, which according to the several degrees of its Corruption and Tincture, appears sometimes yellow and Cholerick, sometimes green and livid, or black and blue; sometimes Melancholick, and sometimes Milky. Aristotle counts the Blood corrupted, when it is changed into Serum. Sometimes the Putrefaction of Blood is so great, that the whole Mass is turned into a rotten putrefied Serum. When the Corruption of blood, is yet greater, sometimes Worms are bred therein, which I have seen come away in the opening of a Vein. Such a Worm being bred in the Veins, may sometimes flow into the right Ear of the Heart, and grow great, and at length gnaw, and eat upon the Heart, as has been often observed in the Dissection of dead Bodies.

Retentive faculty of the Veins being lost, what follows.

The Veins have in them, a Retentive Faculty, whereby they hold fast the Blood within themselves: which Faculty being perished, they suffer the blood to leak out through all the parts of the Body, yea, even to sweat out, as I have seen in some Patients. But more often it flows out immediately by the Nostrils, Mouth, Lungs, Guts, Bladder, by the Womb, and by vomiting.

Blood congealed.

I have divers times seen in malignant burning Feavers, that the blood has been congealed within the Veins, like unto the pith of an Elder stick; which has been noted by Fernelius in his *Physiologia*.

Vena Cava inflamed.

Aretæus writes, That the *Vena Cava* is sometimes inflamed, and thereupon comes to break, which I have seen my self to happen. The Trunk of *Vena Cava* cannot be dilated, so long as the blood circulates freely. Neither is it subject to swellings, termed *Varices*, which are wont to happen only in the Veins of the Thighs and Legs.

Cure of the diseases of Vena Cava, and the blood, two-fold

Of the Diseases of this Vein, and of the Blood contained therein, there is a two-fold Cure; Purgation, and Blood-letting: but blood-letting is more necessary of the two in a *Plethora*, either *ad vasa*, or *ad vires*; or in a *Plethorick Caco-chymia*, or in a very great and putrid *Caco-chymia*, that a portion of the extremely corrupted blood may be taken away.

Purgation. Blood-letting.

Blood-letting takes away such Obstructions as are caused by blood, but not those that are caused by Humors congested in some part of the Body: and therefore that same *Euroia* so often mentioned, that freedom of passage caused by blood-letting, must be understood of the motion, and free passage of the blood through the Veins, and not of the removal of an Humor that is gathered together, and wedged fast into any part of the body.

If blood may be lessened by other waies beside blood-letting.

If blood-letting cannot be put in practice, the Question is, Whether Purgation alone, may supply its place, according to Galens Opinion, in his Book, *de Sanitate tuenda*; or spare eating, exercising the body, frictions, sweating? I suppose, where there is no Fever, the blood may be diminished by the means aforesaid, and also by such Medicaments as draw the Serum out of the Veins; for so the Veins being emptied, the rest of the body may be extenuated: and this is observed, and put in practice in such Nations where the People are afraid of blood-letting. Howbeit, to open a Vein twice or thrice, is a more speedy, and safe Remedy.

A Valve in Vena Cava.

Forasmuch as Sylvius, and Carolus Stephanus, have written, that there is a Valve within the Liver, by the Trunk of the *Vena Cava*, which hinders the blood from returning back; Conringius saies, that it is to be found in Oxen. This favors that Opinion of the bloods being carried from the Liver unto the Heart. It seems to me, that Nature has placed that Valve, that the filth of the mass of blood should not flow back into the Liver, and obstruct the same: which filth, either she carries by some way out of the *Cava* into the *Porta*; or else she sends it forth into the habit of the Body.

Its use.

^a T. 12. f. 1. A B C. ^b T. 12. f. 4. A. ^c f. 1. r r. ^d f. 1. B. ^e T. 12. f. 1. D. ^f f. 1. B. ^g T. 12. f. 1. C D. ^h T. 5. f. 2. g. ⁱ T. 12. f. 1. x x. ^k f. 1. ^l f. 1. a a a. ^m f. 1. D D. ⁿ

Of the Aorta descending.

The descending ^a Trunk of the *Aorta*, sends forth so many branches, as the inferior trunk of the *Vena Cava* produces; but it sends withal, a remarkable Artery, called *Lienalis Arteria*, undivided, by an indirect Course unto the Spleen.

Distribution of
the Aorta descending.

Arteria Lienalis.

Its use.

That same Artery, as large, and wide as a Goose Quil, does furnish the Spleen with Arterial blood, that thereby the thick, and slimy blood, might be attenuated, and made fit to nourish the Stomach, and it's neighboring bowels, and that it might afford a fermenting juyce to the Stomach, to help its Chylification, by that same permixion of both sorts of blood. Peradventure likewise, when the Liver is vitiated, and extreemly obstructed, Arterial blood may be brought unto it, by the Splenick Vein, as it were a Natural *Tartarum Vitriolatum*, to open its Obstructions.

Then it produces the ^b Caliacal Branch, which is divided into as many twigs as the *Vena Porta* is, and has communion therewith, by a mutual Anastomosis of the Vessels, that is to say, by a mutual conjunction of their mouths.

This same Arterial blood, is not circulated, yet may it have a reflux into the Trunk of the *Aorta*, to disburden the parts of superfluous blood; which returning back into the *Aorta*, may conveniently be evacuated, by opening a Vein in the Foot.

The Trunk of the *Aorta* is made of a Membrane, six times thicker than a Vein; and therefore it is not subject to that kind of Tumor, called *Aneurisma*, which the other smaller Arteries are subject unto, by reason of dilatation of their Coat, or its Rupture, or apertion, when in the Arm, an Artery is opened instead of a Vein.

Thickness of
the Membrane
of the Aorta.

The *Aorta*, and *Vena Cava*, do constitute that Region, in which the matter of continual Feavers is contained; but the blood does not remain quiet in that place, seeing it is perpetually moved round by Circulation: wherefore these two Vessels, the *Vena Cava*, and *Aorta*, are ordained both to contain, and circulate the blood, and may be termed the Circulatory Vessels.

The Circulatory
Vessels.

^a T. 12. f. 4. C. ^b T. 12. f. 4. p.

Of the Nerves of the Lower Belly.

Between the two Kidneys, at the Base of the Mesentery, we must search diligently for that same ^a Intertexture of Nerves observed by *Fallopins*, which is woven together of the ^b Stomachick and ^c Costal Nerves, concurring on both sides to form this Contexture; from whence are derived all the ^d Nerves, which are distributed unto the parts of the lower belly.

Contexture of
the mesenteric
Nerves.

When this Contexture of Nerves is full of evil Humors, Convulsions happen with the Colick pains, both in men and women, though the brain be no waies misaffected.

what diseases
arise therefrom

Chap. 28. Of the Kidneys.

THE Kidneys, which are the Instruments of separating, and drawing out the wheyish Excrement, do consist of a fleshy substance, solid and proper to themselves, so that the like is not to be found in the whole body.

Substance of
the Kidneys.

They have a very thin ^e Membrane, or skinny Coat, which sticks close to their flesh; but they have another Coat which is loose, covered with Fat, which is called *Membrana adiposa*, wraps, and infolds the Kidneys, and is produced from the *Peritoneum*.

Their Temper is hot and dry, that they may be the better disposed to attract the ferous Humidities.

Their temper.

They are ^a situate in the Loyns, between a duplication of the *Peritoneum*, which is no other than the *Membrana Adiposa*, and they seem to be placed without the Cavity of the Belly. The Reins are said to begin at the last bastard Rib.

Situation.

- Greatness.** They have in length, the breadth of four or five Fingers; their thickness is two fingers, and they are much about three fingers broad.
- Number.** They are two in Number: sometimes, though rarely, there is but one, and then it is commonly as big as two, and lies upon the back, the Channels of the *Aorta* and *Cava* being a little removed to afford a place for the single Kidney.
- Shape.** They are shaped like those Beans we call Kidney-beans.
- Color.** Their Color is reddish.
- Vessels.** You shall observe in their hollow side, the Emulgent Vessels, and the Ureter springing forth of that hollowed side. Their Vessels are the Emulgent Veins and Arteries, proceeding from the Trunk of the *Cava*, and *Aorta*.
- Kidneys, how shaped in children.** And this is the outward Conformation of the Kidneys in a grown man or woman: in Children it is otherwise til they are a year old, because the external face of the *Uva* being like a thick bunch of Grapes, does nearly resemble the Kidneys of a Calf: and upon the Kidneys, is placed the *Glandula Renalis*, which is shaped like the Kidney, and in Children, dries up by little and little, til it become flat, being separate from the Kidneys by a portion of the *Membrana adiposa*, though it be found not far off in either side.
- Its internal Structure admirable.** The internal Structure of the Kidney, is admirable; which that you may conveniently view, and search into, you must cut it artificially on the hollowed side; and then there will present it self to your view, the enwidened substance of the Ureter, which forms the *Pelvis*, or Basin; into which, from the upper part, as it were from an House-top, the wheyish Humor rains down drop after drop, through nine little fleshy Teats, called *Caruncule Papillares*, which are acuminate without, and are enclused, and thrust into nine Pipes, made of the substance of the Ureter dilated. Therefore that covering, through which the wheyish Excrement drops, may be called the *Cribrum Renum*, or Kidney-sieve.
- The Basins.** In those papillary Caruncles, or fleshy Teats aforesaid, the Serum, or wheyish Excrement, is separated from the blood; which blood spends it self to nourish the Kidneys, or flows back again into the Emulgent Veins.
- The Teats.**
- The sieve.**

^a T. 3. f. 8. Δ. ^b f. 8. iii. ^c f. 8. BB. 2. r. ^d T. 3. f. 8. l m n. ^e T. 5. f. 2. E. ^f f. 2. AA. ^g T. 5. f. 1. BC. ^h f. 1. FG. f. 2. KK. ⁱ f. 2. HII. f. 5. P. ^j f. 2. aa b b. f. 5. C. ^k f. 2. F. ^l f. 2. G. ^m T. 9. f. 2. BD. ⁿ f. 2. A & C. T. 5. f. 1. AA. f. 2. BB. f. 3. & 4. AA. ^o T. 5. f. 5. AA. ^p T. 5. f. 6. EE. ^q T. 5. f. 6. DD.

The Medicinal Consideration.

- Infirmities of the Kidneys are** The Similar Constitution of the Kidneys, contrary to Nature, consists in the Depravation of their Temper, and of their Substance. A distemper either single, or with matter, causes a Laxity or looseness in the substance of the Kidneys, whence springs *Atonia*, or want of their wonted vigor to act by. By means of an hot distemper, they come to be inflamed, whence follows an *Imposthume*, and at last an *Ulcer*, as well in the internal, as external parts: for oftentimes a morbidick matter, is collected within the *Membrana adiposa*, which breeds *Impostumes* which compress the Kidneys.
- Laxity, how caused.** Laxity proceeds from a cold and moist distemper, or from an exceeding hot one, which corrupts the Natural temper of the part; whence comes *Atonia*, or an impotency to contract it self; and from thence comes *Diabetes*, which is the Pissing sickness; or *Ischuria*, which is a total suppression of Urine, not only in one Kidney, but in both, by reason of Fraternity, and Co-partnership, by reason of an afflux of a malignant air from one to the other; or by reason of a reflux of corrupt and filthy blood. Sometimes want of Appetite to meat, is a fore-runner of this disease, by reason the Stomachs sympathizing with the Kidneys. Observe diligently when

when the Stomach is ill, if there be no Disease in the Kidney; for if there be, that's the cause of the Stomach's disorder.

The Number of the Kidneys is seldom changed, and if there be but one, it cannot be known that there is more; neither can that one perform as much as two: and therefore those that have but one Kidney, enjoy not their health so well as they that have both.

Although the Kidneys seem fast fixed unto the Loyns by the fat, as it were with glue; yet do they sometimes fall out of their place, and lean forward, sometime they slip into the belly, not without detriment to the Patients life and health: this is a truth not to be questioned. Which comes to pass chiefly, not only by melting the fat in which they are wrapped up, but also by their weight, when they are grown too great, by reason of some tumor or stone contained in their Cavities, that they can no longer be kept in their place by such staves as were wont to hold them. Being fallen into the belly, they stay there a while, and at last they putrify, and impostumate.

*Falling down
of the Kidneys.*

Being in their natural Situation, if they prove greater, or more weighty than ordinary, they cause a kind of numbness in the thigh, by compressing the Muscle *Psoas*, and the Nerves, which descend into the Thighs, which are conveyed through the fleshy parts of the Muscle *Psoas*.

Their swelling

If the inner Passage of the Kidneys be stopped moderately, either by an Humor, or by a stone, then the parties Urines are thin; or if the Obstruction be total, the Urine is wholly suppressed.

Stoppage.

If the inner Substance of the Kidney be exulcerated, the Patient makes urine with Matter, or Quittor in it.

Ulcer.

If a Vein be opened, or broken, bloody urines are made: and because the Kidneys communicate with the Stomach by the Stomachical Nerves, the Stomach does sympathize with them, being sick, and enclined to vomiting.

*Vein opened,
or broke.*

The Action of the Kidney, is to attract Serum, and to separate, and expel the same: these things it cannot do, unless it be sound and perfect; and therefore all the Diseases aforelaid, may pervert the same Action. The flesh of the Kidneys is dull of feeling, but the inward Membrane is very sensible.

Action Hurt.

Stones are often bred in the Cavity of the Kidneys, either in the pipes, where they grow like Coral, or in the Basin, where a round stone is formed. If the Stone encrease so much as to cause a suppuration in the Kidney, towards the Loyns, by a deep issue made in this part, the Quittor may be purged forth, and the stone extracted; otherwise, unless Nature do go before us, and shew us the way, it were a wicked thing to attempt an Incision of the Kidney, by reason of the thickness, and profundity of the flesh in those parts.

*Stones bred in
the Kidneys.*

*when curable
by Incision.*

The Kidneys do sometimes consume away, and cause an universal Consumption of the whole body; which comes either from putrefaction of the Kidneys, or through overmuch ejection of Seed or Sperm.

*Consumption
of the kidneys.*

In new married Couples, and in such as are more wantonly disposed than ordinary, this Consumption of the Kidneys happens; which would make some man affirm, that the matter of Seed, comes from the Kidneys, and that they carry a great stroke in the matter of Carnal Imbracements.

*who most sub-
ject thereunto.*

Observe, That oftentimes through weakness of the Kidneys, which cannot attract the wheyish Excrement, a dropsie is caused without any fault of the Liver. Neither can the most effectual Diureticks open those passages. And therefore our chief Care must be to purge those, and the neighboring parts, and by Fomentations, to restore the lost Faculty of the Kidneys.

*Dropsie from
the kidneys
weakness.*

*How to be
cured.*

Whether or no, may we force in a sharp pointed Iron, to one of the Kidneys, that a passage may be made for the Serum, which is dammed up within the greater Veins, in case we cannot purge the same away with Hydragogues, or Water-Purgers?

Chap. 29. Of the Ureters.

Their Description. **T**He Ureters are Channels or Conduit Pipes ordained to convey the Urine to the bladder.

Substance. They consist of a single Membranous substance, which being enclosed in a duplication of the *Peritoneum*, therefore Anatomists have said, that they borrow another Coate of the *Peritoneum*.

Length. They are as long as the Space between the Kidnies and the bladder.

Situation. Resting upon the ^a Muscle ^b *Psoa*, they are obliquely carryed towards the *Ossa Ilium*, and rising up unto the bladder in the bottom thereof, they slip in between the two ^c Coates almost as far as the ^d Orifice, where they pierce the ^e bladder. They have no Valves placed in their Extremities, to hinder the going back of the Urine: but two Membranes meeting together, do exactly shut the Passage.

Wideness. Naturally they are as thick as Goose-quills, but in such as have the Stone and use to void little ones from the Kidney, the hollownels of the Ureters is so widened, that they have been seen as thick as a Mans Finger in the dissection of dead bodies.

Original. The Original of the Ureters is rather from the bladder than from the Kidnies, because they are of a Membranous substance. Within the Cavity of the kidnies they are divided into nine Pipes, which are fitted to the little fleshy Teates called *Carunculae Papillares*, that they may distil the *Serum* into the *Basin* or large Cavity of the Ureters, within the Kidnies.

Nerves. They are thought to have Nerves whereby they feel; but being of a Membranous Nature, their extream pain in the passage of a Stone, proceeds from the stretching of the Membrane.

Obstruction. Seeing therefore they are ordained to pass the Urine unto the Bladder, they are offended with such things as pass through them, whether it be sharp Urine, or purulent matter, or a little Stone, or a thick and clammy Humor, by which they are obstructed. So that the most usual Disease of the Ureters is Obstruction.

Stone. And if within the duplicature of the Bladder either of them be obstructed, there is bred a Stone, which grows by little and little, which is not movable, but remains fastned to the Bladder, which when those that Cut out the Stone endeavour to pull away, they tear the Bladder. Neither do I think there was any other difference of the Bladder in these, in whom a double Cavity was observed, and a Stone lying close in the one of them.

^a T. 5. f. 1. FF. GG. ^b T. 10. f. 100. ^c f. 7. FF. ^d T. 10. f. 7. D. ^e T. 6 f. 6. cc.

Chap. 30. Of the Piss-Bladder.

Its Substance. **T**He Piss-Bladder, is the Receptacle of Urine; being framed of a Membranous substance consisting of two ^a Coates. The ^b third which they attribute thereunto, is a Duplication of the *Peritoneum*, within which it lies hid, hanging like a Bottel with its bottom upwards, and with this Partition it is severed from the Guts and other Parts, only in mankind, least with the weight of the Guts bearing thereupon, it should be forced out of its place.

Magnitude. Its natural size is smal when empty, because it is widened and contracted according to the quantity of the Urine. The efficient Cause of its Contraction, is the second and external Membrane, which is altogether fleshy, which *Fabricius ab Aqua Pendente* took to be Musculous, and after him *Spigelius*, who calls it *Musculum Detrusorem Vesicae*. He might better have called it *Expulsorem*, the Expulsive Muscle of the Bladder.

Its shape represents a bottle with the bottom upwards, whose bottom is in the lower Part of the *Hypogastrium*, and its Neck lies hid beneath, under the Bones of the *Pubis*.

Shape.

The Piss-bladder is but one in Number, yet severed sometimes into two Cavities, after the manner before expressed.

Number.

It is perforated with three holes near the Neck. The first and greatest, is that out of which the Urine passes: the other two being those by which the Urine comes into the Bladder, are the Ends of the Ureters.

Holes.

Its Orifice is shut by the Muscle *Sphincter*, which is formed of the substance of the bladder contracted. There is another Muscle called *Externus Spleniatu*s, as broad as two Fingers, which is placed about the Neck of the bladder and the Glands or Kernels resting thereupon, termed a *Prostata*. The power of shutting and opening the bladder depends upon this Muscle.

Muscles.

The Piss-bladder has Veins and Arteries from the *Hypogastrical Vessels*; it has Nerves in its Neck, from the *Os Sacrum*, and in its body from a Nerve of the *six Pair*. Which is diligently to be considered in Diseases of the bladder causing stoppage of Urine, which proceed from a fall caught upon the Loins or *Os Sacrum*.

Vessels.

The Medicinal Consideration.

The Piss-bladder is subject to an infinite number of Diseases. In its substance it is subject to all kind of Distempers, especially hot and cold: it suffers Inflammation, Tumors, Ulcers, and Palsie both in the Neck and whol Body thereof. Of which we shall Discourse particularly.

Diseases of the Bladder.

Its temper is perverted, when the bladder naturally cold and dry, comes to wax hot, and falls into an inflammation.

In its Temper.

Its Scituation is changed, when that Part of the *Peritoneum* in which it is included is relaxed, whereby it slips a little downe; which causes a difficulty in pissing, unless the lower Part of the Belly be lifted up with the Hand. Sometimes by the weight of many little Stones it comes to have an hollow nook, by the side of the straight Gut near its Neck, and then the Stones do nestle in that corner, so that they cannot be perceived by putting in a Catheter: but the best way to feel them, is by putting ones Finger into the Fundament.

Scituation.

Its greatness or wideness cannot certainly be defined unless it were empty; however it is enlarged and widened according to the quantity of Urine. But if it be so much enlarged as to exceed the natural measure, then the *Fibres* of the Coates being broken or too much flaccid, the party cannot make Water, because the fleshy Membrane is deprived of that motion, by which the Urine ought to be expelled. And in this Case the Water cannot be voided otherwise than by putting in of a Catheter, which sometimes for a Month or two, must be done twice a day, until the Membrane have recovered its antient tone or contractive Vigour.

wideness.

Sometimes the bladder is so contracted and straitned, by reason of a painful exulceration in its inner Part, and then grows thicker and as it were Cartilaginous, which hinders its distention: and in this Case, the Patient must often make Water with pain.

The Neck of the bladder comprehending its Orifice or the Channel of Urine, has also its Diseases. It is frequently inflamed, swelled Ulcerated, obstructed, and is weakened by the Palsie, when it can neither be contracted nor relaxed, seeing it is thicker and more fleshy than the bottom of the bladder. It is easily inflamed, and *Fernelius* was of Opinion that no other Part of the bladder is subject to inflammation: from whence proceeds an Ulcer, which is not so hard to Cure, as that which happens within the body of the bladder, because injections and convenient Candles may be conveyed thereunto.

Diseases of the Neck of the Bladder.

It is frequently obstructed by the Stone lying hid in the bladder, or by a fungous

How Obstructed.

fungous body which grows therein. Yea and sometimes beyond the Neck, within the bladder, fungous or Spungy carnosities do arise, which do much trouble the bladder and fill the same. They arise often from a flux of blood, or a swelling Vein, which being opened causes an incurable Issue of blood, which soon causes a Gangrene by reason of Clotters of Blood remaining there.

Spungy Carnosities do grow without the Neck within the Ureter, which are termed *Hypersarcosae*, which are easily Eaten away with Medicinal Wax Candles, made and fitted for that purpose.

Often times they happen in the Passage of the Urine after a Venemous *Gonorrhoea* not well Cured.

Also the Neck of the bladder is obstructed by another external Cause, Namely by swelling of the Kernels termed *Prostatae*, which rest upon the bladder. But the Urine is often stopped by a Palsie in the Neck of the bladder, so that the *Sphincter Muscles* cannot contract nor dilate themselves.

The Key of
the Bladder, an
Instrument so
called.

To open the Bladder and to search out the Diseases which are bred within or without the same, a wonderful new Instrument has been invented, which I call the Key of the bladder; its commonly termed a Catheter, and is used by such as Cut Men for the Stone, being different from the Antient common Catheter. So long as this Instrument can easily be put in, so long there is great Hopes in Diseases of the Bladder: but when it will not Penetrate, all Hope is gone.

Bladder per-
forated.

Perineum
opened.

Urine let out
with a Knife.

In such a Case, either the bladder is perforated in the bottom of the belly by the *Os Pubis*, to let out the Urine, or the *Perinaeum* is opened. But when a Catheter with grates in it, upon which the Section is wont to be made, cannot be thrust in, to depress the Neck of the bladder which lies hid under the *Os Pubis*, a small Knife is thrust deep in as far as the bladder sidewaies, until the Urine comes away: for so I have often freed many from imminent Peril.

Ease for old
Men that have
the Stone.

In persons far in years, who are greivously troubled to make Water by reason of a great Stone, which cannot be taken out without manifest danger of Death, to give them some releife in their Miserie, the *Perinaeum* is cut in the same manner, as is used to take out the stone, and the hole is kept open with a little Pipe. So long as the Patient can be kept alive, the little Pipe is stopped with a Tent, and a Sponge is applied to receive the droppings of the Urine, if any be, until such time as the patient must needs make Water, and then the stopple is taken out, and afterwards put in again, and thus the cruel pain and continual provocation to piss, is Mitigated in such as have the stone.

Ulcers of the
Bladder clen-
ed.

Zecchini's
vain Brag.

Also by this means Ulcers of the bladder may be cleansed and dried, if there be no Stone, to fret upon the Ulcer.

Zecchini brags in his Counsels, that he invented this way of giving ease to Aged persons vexed with the Stone; but the Physicians of *Paris* did use this Palliative Cure long before *Zecchini* was born, it having been practised this hundred years.

The Stone
Suckt out.

If a Stone in the bladder be little, and stick to the Neck of the bladder, or in the beginning of the Ureter, it may be drawn forth by a strong and continual sucking of the yard, or it may be drawn out by an incision made in the Ureter.

Cut out of the
Bladder.

If the Stone be great it cannot be taken out but by Cutting of the bladder, the Incision being made upon the *Perinaeum*, as our Stone-Cutters are wont to do: for the way used by the Antients as it is described by *Celsus* is difficult and dangerous.

The Egyp-
tian Operation
naught.

And I beleive that kind of operation used in Egypt, when they would take out the Stone, is as difficult, which is by blowing up the bladder with a Pare of Bellows. For this operation described by *Prosper Alpinus*, is so absurd, that I doubt the truth of the story, because it is exceeding cruel and painful by reason of the extreme stretching of the bladder, which cannot indure distention, neither in its Neck, nor in the Ureter.

And that of
Hildanus
is naught.

That way which *Fabricius Hildanus* goes to take out the Stone, is also absurd and dangerous. The way used by the Operators of *Paris* and by some Italians of the

the Nutrition Family, is the only safe and easie way, by reason of the Instruments and of the Industrious Dexterity of the Artists; wherefore I wish other Nations had such Operators.

The French & Italian w the best to take out the Stone.

^a T. 5. f. 1. F F. G G. ^b T. 10. f. 1. O O. ^c f. 7. F F. ^d T. 10. f. 7. D.

^e T. 6. f. 6. c c.

^a T. 5. f. 7. B. and C. ^b f. 7. A A. ^c f. 7. B B. ^d f. 7. B. ^e f. 7. E E.

^f f. 7. D. ^g T. 6. f. 6. c c.

^a T. 6. f. 5. F F. ^b T. 12. f. 1. and 4. 2 2. ^c T. 3. f. 8. o. T. 18. f. 5 o. ^d T. 8. f. 8. A B.

Chap. 31. *Of the Genitals of a Man; and first of the Yard.*

I Proceed to the Genitals of a Man, among which, the Yard, which is associated with the Piss-bladder, because it casts out Urine through the Pipe of the Ureter, ought in the first place to be explained.

A Mans Yard

It is made up only of Skin for thinnes sake, of two hollow Ligaments, of the Urethra, the Glans or Nut, certain Muscles, Membranous bands, Nerves, Arteries and Veins.

Its Parts

The Skin is by it self, has no Scarf-skin, and is terminated at the Root of the Nut. Being loose, it is there doubled in manner of an Head-stal, that it may infold the Nut or Head of the Yard and make the Fore-skin, which the Jews and Mahometans do cut off, out of a Religious Ceremony. Such Circumcised Persons cannot give that delight to Women in their carnal Embraces, as those can who have the Fore-skin entire. And therefore their Women are better pleased with the carnal society of Christians.

Skin

Fore-Skin

The Fore-skin is tied to the Nut by a little band which is termed *Frenulum*, the bridle: it is extended in the nether Part unto the Orifice of the Nut, in young Men that have not had to do with a Narrow-board Virgin.

The Bridle.

The Skin being removed, there appears a Membrane which closely girds in the Ligaments of the Yard, which may be a production of the *Panniculus Carnosus*.

The Membrane

This being taken away, the Vessels are seen which run along the Back of the Yard viz. Nerves, Veins and Arteries. The Nerves come from the *Os Sacrum*, the Veins and Arteries are portions of those termed *Pudenda*, which are spread out into the external Parts.

The Vessels.

Then follow the Muscles of the Yard, two of which are erectors, and two are Ejaculators. The Erectors do arise from the Tuberous Part of the Huckle-bone and are sidelong fastened to the Ligaments of the Yard; the Ejaculators springing out of the Transverse Ligament placed between the Huckle-bones, and from a portion of the Sphincter Muscle, are spread along the Urethra, to press the Drops of Water or Seed which happen to rest there towards the Orifice of the Blader.

The Muscles.

These Muscles being taken away, three Bodies come to view which form the Yard, Viz. The two Ligaments and the Urethra.

The ^a hollow Ligaments being disjoined beneath in the *Perineum*, do arise from the Protuberancies of the Huckle-bone, and have in their progress, the ^b Urethra interjected. Neer the *Os Pubis*, being joyned together they make a Pendulous Body terminated with the Nut, which is called *Penis*, the Yard.

The hollow Ligaments.

In those Ligaments we must observe the internal substance which is like the Pith of Elder, being Spungy, blackish and bedewed with black Blood, that it may encrease and decrease in the Carnal Conjunction, for the erection of the Yard depends upon these Ligamentss.

Their internal Substance.

The Urethra or Piss-Pipe, is a Channel of Spongy substance, that it may swell and tal with the foresaid Ligaments in the Carnal Conjunction; and therefore it is

The urethra or Piss-Pipe.

Its Obliqua-
tion in the Pe-
rineum.

no continuation of the neck of the bladder, but is only fastened thereunto. Observe diligently, the Obliquation, or Reflection of the *Urethra* in the *Perinaeum*, and how the Situation of the Orifice of the bladder lies hid under the bones of the *Pubes*.

Impostumated
hard to cure.

In the *Perinaeum*, divers Tumors are raised: but such as adhere to the *Urethra*, and impostumate, are dangerous, often degenerating into *Fistulae*, because the *Urethra* wil very hardly heal, and grow together. If it be eaten by a venemous and pocky Ulcer, it is not easily cured, and restored, unless by an exact *Sudorific* Diet, or by fluxing with *Mercurial* Medicaments.

The Nut of
the Yard.

Balanus, the Nut of the Yard, is an hollowed Kernel, wider in the middle, than the largeness of the external Orifice comes to.

^a T. 6. f. 5. M. ^b f. 2. C. ^c f. 1. d. f. 5. L. ^d f. 5. L. ^e f. 5. M. ^f f. 7. A. ^g T. 13. f. 8. o. o. T. 18. f. 5. o. ^h T. 12. f. 1. n. n. f. 4. 00. ⁱ T. 6. f. 1. a. a. f. 5. H. H. ^k f. 5. K. K. ^l f. 1. b. b. f. 5. 11. ^m T. 6. f. 5. K. K. ⁿ f. 5. G. G. ^o f. 1. c. ^p f. 7. B. ^q f. 5. G. G. ^r f. 5. M. f. 7. C. ^s f. 5. infra. M. ^t

The Medicinal Consideration.

Diseases of the
whol Yard are,
Priapismus,

The Action of the whol Yard, viz. voluntary erection, and stiffness, being ordained for carnal Conjunction, if it be involuntary, and painful, it is a Disease which is called *Priapismus*.

It is caused by an inflamed disposition of the Ligaments of the Yard, and also of the *Urethra*, or Piss-pipe, which is affected by reason of vicinity, and communication in the same Action.

Want of Ere-
ction.

Weakness, and defect of Erection, is an imbecillity of the whol Yard without pain: It arises from a weakness, or a paralytick disposition of the Muscles, or Nerves of the Yard.

Crookedness

Sometimes the whol Yard is bowed, and crooked to one side or another; or-bended upwards or downwards; which proceeds from a Convulsion of one of the Muscles, or from a repletion, and induration of the Nervous Ligaments of the Yard. Sometimes the Tumor called *Ganglion*, in the hollow Ligaments, is a cause of this Conterfion, or crookedness of the Yard: of which Infirmitie, *Hollerius* in his Comment upon the 63. Aphorism, of Book 5. and *Cesar Arantius* in Chap. 50. of his Book of Tumors, have treated.

Inflammation,
Tumors, and
ulcers

Furthermore, The whol Yard is subject to Inflammations, Tumors, and Ulcers.

The Yard is but one in Number, for two had been needless: if we find two, it is Monstrous, and they are both uselets; or one is but the rudiment of a Yard, or some fleshy Excrecence.

Too long,

The just, and fitting length of the Yard, ought to be six or eight fingers breadth; if it be longer, 'tis inconvenient, and hurts the Woman in Carnal Conjunction, and must be shortened by a ring of wool put about it.

Too short

If we beleeve *Galen*, the extraordinary length of the Yard hinders Generation, because the Seed loseth its vertue in so long a passage; which I do not beleeve.

If the Yard be too short, it causes little, or no titillation, and is unfruitful. *Fallopins* in his Book de *Decoracione*, teaches us how to make the Yard longer. *Martial* mentions one that had so large a Yard, that when it stood erected, he could smel to it with his Nose.

Of the Fore-
skin.

The Fore-skin has its Diseases; sometimes it is too short, and sometimes too long, and is incommodious. The Jews have it cut off, for which cause they are termed *Apellæ*, that is, skin-less. If it cover the Nut of the Yard so close that it cannot be put back, the Disease is termed *Phymosis*: If it be depressed to the root of the Nut, and cannot be drawn upwards, 'tis termed *Paraphymosis*.

Phymosis
Paraphymosis,

Both

Both these Diseases, if they proceed from fervency of Carnal-Conjunction, whereby the Nut of the Yard remains swelled, if it be for a long time together, fomented with extream cold Water, its swelling wil abate, and then the Fore-skin may freely be drawn up or down. An admirable Secret.

It is exulcerated with pocky-Pustles; which being cured, if they leave any hardness behind them, it is a suspicious Argument that the Venom of the Whores Pox, does yet lie lurking in the Body. Seeing the Fore-skin is double, when it is cut, both the internal, and external Membrane, must be equally cut. Exulcerated.

The band of the Fore-skin termed *Frænulum*, if it be more thick than ordinary, and goes unto the hole of the Nut, and makes the same crooked, it makes men such as *Galen* calls *Hypospadicos*; so that they cannot ingender, because they do not cast their Seed directly into the Womb, unless it be cut. Thickness of the Frænulum.

The Nut is subject to divers Tumors, and Ulcers, both internal and external. In its middle, where 'tis hollowed, it is often exulcerated, by reason of a sharp matter abiding there, and often putrefying. But in the Whore-masters Pox, it is full of Warts, and deformed; which warts may be eaten off, and eradicated with powder of Savin; but they grow again, if the internal Cause be not removed, by Medicines accommodated to cure the Pox. Ulcers of the Nut.

The *Urethra*, or Piss-pipe, which lies along under the two Ligaments of the Yard, has its Diseases. It is obstructed by the stone, which is taken out by Incision thereof. It is inflamed, by reason of its Spungy; and blackish substance, like the hollow Ligament of the Yard. It oftentimes burns, and is pained by reason of the acrimony of the Urine; it is inflamed by the sharpness of a putrid Humor, which passes through the same, as in the virulent *Gonorrhæa*, and then it swells, and makes the Yard crooked, and stretches it with the *Tentigo* like a Rope; which disease they term *Gonorrhæa Chordata*, the Corded, or Rope-stretched running of the Reins. The urethra. obstructed.

It is ulcerated by the Acrimony of Quittor, and purulent Matter; and sometimes the Ulcer being not well cured, there grows up a spungy superfluous flesh, which is termed *Carnositas*; which must be diminished, or eaten away, with Corrosive Candles; otherwise it swells so as to shut up that passage, and stop the Urine, not without pain to the Patient. Inflamed.

To the *Urethra*, and Cods, belongs that disposition which makes men termed *Hermaphrodites*, when the Testicles are hidden within the *Septum* of the *Peritoneum*, and the Cod is empty, or open in its middle part, by reason of the *Urethra* being there perforated, seeing the sides of the Cod are like the Lips of the Womb, and the Yard is very small. These things have deceived unskilful Midwives, and made them judg Children so born to be Females. Ulcerated.

Sometime the *Urethra* is perforated above the Cod, or neer the Nut of the Yard, which is then shut up, and solid, which hinders the right ejaculation of the Seed, unless the *Urethra* be opened, and a little pipe be put in, to make a passage. But when the Parties grow into yeers, the heat of the body being augmented, also by violent exercises, and by plucking the same oftentimes, the Yard comes to be augmented, and the Stones which lay hid in the Groins, do fall into the Cod, unless it be perforated as aforesaid; or the Stones remain in the Groins, and often deceive Physitians, making them to think the Persons are bursten. Hermaphrodites.

Such Persons having been accounted Women, do at last become Men. Howbeit, there never was any Woman turned into a Man, unless she abused her *Clytoris*, being prolonged, or some superfluous Flesh have grown out of her Womb, which may have the form and stiffness of a Mans Yard, but is no way compounded as a true Yard. And therefore Women are rather delighted with the mutual rubbing of their bodies one against another, and by the lying of the one upon the other, than by the vain titillation, and unprofitable intrusion of those Parts. A woman is never changed into a man.

Chap. 32. Of the Groyns.

Things to be
observed.Crural vessels.
Process of Pe-
ritoneum.Muscle Cre-
master.

Kernels.

Spermatick
Vessels.Descent of the
Gut Ileum.

Buboes.

Insensible
gelding.

BEfore we proceed unto the Stones, we are to take notice of the Groyns; in which are to be seen, the Crural ^a Vein, and ^b Artery, with the ^c Nerves descending into the Thigh, whereupon does rest the Production of the ^d Peritoneum, drawn through the holes of the oblique Tendons, and transverse Muscles.

Over this is spread the Muscle ^e Cremaster, being carried athwart through the Groyn into the Cod, and so unto the Testicle, which it encloses with two Coats; the one whereof is called ^f Erythrois, and the other ^g Elythrois.

Above the bending of the Groyn, you may see those Glandules, or Kernels, which lie close to the process of the Peritoneum: below the Groyn, neer the Vessels, you may see other Glandules, or Kernels, bordering upon the Vessels.

Within the Process are contained, Vas ^h Spermaticum, the Spermatick Vessel, which carries matter to make Seed of, unto the Testicle; and another ⁱ Spermatick Vessel returning from above, and carrying the Seed from the Testicle, to the Seed-bladders. In the Groyn, within the Process of the Peritoneum, descends the Gut ^j Ileum, the inward Coat of the Peritoneum being relaxed.

If it descend into the Cod, the said Coat is broken, and the descent of the Gut is to be observed through the holes of the Tendons, which are interchangeably disposed, lest in reducing the Gut by Chyrurgical Operation, it come to be placed among the Combinations of Nerves; for the hole of the last Tendon ought to be cut in tunder, that the Gut may be reduced into the Cavity of the Belly; in which work, many of the very skilfullest Chyrurgeons have erred, to the loss of their Patients Lives.

Note that among the Kernels above the Groyn, do arise the Whore-pock buboes or Swellings: among the Glandules, or Kernels, below the Groyn, pestilential swellings do arise; ordinary swellings do arise a little higher.

Here you shal consider whether it be safe to use that prick, or Thread of Gold or Lead about the Production of the Peritoneum, that the process which in the Rupture called Oscheoceles is broken, may be drawn together: or a Caustick to produce an Elchar, may be applied above the Groyn, to produce a Callous, or hard substance, which may stop the passage of the falling Gut. But care must be taken that the Caustick pierce not to the Vessels which lie beneath, viz. The Veins and Arteries, which being touched, the Patient dies for it.

The Seminal Vessels may be seared, and so a man become invisibly gelded, because the Stones wanting their nourishment, do consume, and lose their Vigor. But I see on every side, great difficulties in these kind of Operations, which I judge to be dangerous; and therefore I conceive the best way is, to let them alone.

^a T. 24. f. 4. A A. ^b f. 5. A A. ^c T. 18. f. 5. K L M N. ^d T. 2. f. 9. E E
^e T. 6. f. 2. D D. ^f T. 6. f. 2. ^g f. 2. C C E E. ^h T. 6. f. 1. A. f. 3. and
4. A A. ⁱ f. 1. V V. f. 3. C C E. f. 3. C C D. f. 5. C C. ^k f. 5. and 6. E E.
^j T. 3. f. 4. H H.

Chap. 33. Of the Fundament.

Order of Se-
ction.

Its Name.

AT the same time, when the Cod is dissected, in the Order of Anatomy, by reason of Neighbor-hood, the Fundament is to be dissected, and demonstrated.

The Fundament therefore, called *Anus*, and *Podex*, is the outermost end of the ^a Intestinum rectum, or straight Gut, which is shut, and purged together by a round Muscle, called *Sphincter*.

It is two-fold; the one is skinny, and narrow; the other is broader, and more fleshy; which adheres to a transverse Ligament, which is placed between the Pro-
tuberances

ruberances of the Huckle-bone, and the extremity of the *Coccyx*, or Crupper-bone.

The Fundament has four Muscles, called *Levatores*; two of which are broad, and two narrow: The broad do arise from the *Os Sacrum*, and *Os Ilium*, and are inserted into the larger Sphincter: As for the other two, the former arises from the transverse Ligament, the hindermost from the Crupper-bone, whereinto they are terminated.

These four Muscles do relieve, and raise up the Fundament when it pouches forwards, and is ready to fall out in the expelling of Excrements which are more hard and solid than ordinary. The Circular Muscles do shut, and contract the Fundament, lest our Excrements should come away against our wills: for by means of these Muscles, we may take our own time, and regulate this kind of Evacuation according to our own pleasures.

^a T. 3. f. 7. M. ^b T. 3. f. 7. O. ^c T. 3. f. 7. NN.

The Medicinal Consideration.

The Fundament is liable to very many Diseases. It is sometimes possessed with an hot distemper, with a troublesome, and almost intollerable itching, which causes a continual desire of going to stool, which is called *Tenesmus*.

In the Expulsion of the Dung, sometimes the Fundament falls out, which is reduced into its place with extream trouble and difficulty.

Sometimes it is palsied, and the Excrements come away whether the Patient wil or no: and sometimes it is so straitened, that a man can hardly void his Excrements.

Within, and without it swells, the mouths of the Veins being swollen and knobbed, which are called *Hæmorrhoides*, both internal, and external.

Sometime 'tis inflamed, but it is more often impostumated; from whence proceeds an hollow Ulcer, termed *Fistula Ani*.

It is made rough with Warts, which are called, *Condylomata*, or *Mariscæ*. It is exulcerated with small Clifts, which are called *Rhagades*. It may safely be cut, according to *Hippocrates*, after any fashion, without hurting the Sphincter. Finally, 'tis troubled with all kinds of Diseases.

Sometime it has a Scirrhus Tumor, which shuts up the passage of the Excrements, and causes a difficulty in pissing, by reason of the near neighborhood of the Arteries, Gut, and the Neck of the Bladder; which Parts do communicate their Infirmities one to the other.

It is sometimes found closed up in new-born Infants, and it is cut open: but if the Gut be found solid, having no Cavity, there is no way but death.

Chap. 34. Of the Cod, and Stones.

WE are now come unto the *Cod*, which is the Case of the Stones. It consists of two Skins, the outermost being *Cuticular*, and grown with hair in such as are of ripe years; it has the *Epidermis*, or Scarf-skin upon it. Under the hairy Skin, there is a fleshy Membrane which called *Dartos*; it is a Continuation of the *Membrana Carnosa* of the Belly, stretched down unto the Cod; by help whereof, the Cod is widened, or contracted into wrinkles. For the Stones sake, it is by a Membranous Portion divided into two Cavities, which receive the two Stones.

The Cod has Veins and Arteries from the Privy Parts, and Nerves from the *Os Sacrum*.

A Stone, or Testicle, is a Glandulous, or Kernellish Body, ordained to make Seed. It is compounded of many parts, of which, the first are three proper Membranes, for each Stone has two common ones, viz. the *Cutis*, and *Dartos*. The first of the three proper Membranes, is called *Erythroides*, which has its Original from

Muscles.

Their use.

Its diseases.

Tenesmus.

Falling out.

Palsie.

Hæmorrhoids.

Inflammation.

warts.

clifts.

Scirrhus tumor.

Closed up.

The Cods, their Coats.

Cavities.

Vessels.

The Stones, their Coats.

from an expansion, or widening of the Muscle Cremaster, which holds up the Stone.

The Second is the Production of the *Peritoneum*, which infolds the Testicle.

The Third immediately infolds the substance of the Testicle, and is called *Nervea*, the Nervous Membrane.

Substance. The Membranes being taken away, the Substance of the Testicle comes in sight, which is ^h glandulous, white, pretty firm; and upon the same, overthwart, is placed a final body like a Silk-worm, which is called ^a *Epididymis*; to the one end **Epididymis.** whereof, there cleaves *Vas Spermaticum* ^b *deferens*, the carrying Spermatick Vessel, which enters into the substance of the Testicle, and empties the Seminal matter **Sperm Carrier.** thereinto: From the other end of the *Epididymis*, arises the *Vas* ^c *Ejaculatorium*, the Ejaculatory Vessel, which in its beginning, is ^d full of turnings and windings, as is **Ejaculator.** the Body of the *Epididymis*, and firmly cleaves unto the Testicle by its ends, being loose, and separate in its middle.

Situation. The Testicles are excluded from the Cavity of the Belly, being placed in the **Cods.** They are about the bigness of a Pigeons, or young Pullets Egg. They are **Figure.** of an Oval shape, and their work, is to elaborate the Seed. **Action.**

The Medicinal Consideration.

Diseases of the Cods. The Natural Constitution of the Cod, and Stones, being explained, let us now examine the Preternatural disorder thereof. The Cod is apt to be swelled with divers fluxions, which flow either immediately into it, or into the Stones.

Oscheocele. If the Gut fall into the Cod, or into the Cal, it makes that kind of Rupture which is called *Oscheocele*.

Hydrocele. If water or wind flow from the Cavity of the belly, into the Cod, they make those Ruptures which are termed *Hydrocele*, and *Pneumatocele*.

Circocoele. If in the Spermatick Vessels, both Deferent, and Jaculatory, where they are full of turnings and windings neer the Stones, thick blood be intercepted, it breeds a tumor, which is called *Circocoele*.

Sarcocoele. If Spongy flesh breed, and grow to the Membrane called *Dartos*, it is termed *Sarcocoele*.

If the Testicle adhere to the said spongy flesh, it has the same name.

If the Stone swell, and exceed its natural bulk, it causes a swelling in the Cod.

Pneumatocoele. If wind or water insinuate themselves into the Membranes of the Testicles, they produce those Tumors which are called *Hydrocele*, and *Pneumatocoele Testiculorum*, which are familiar to Children.

Inflammation. Moreover, The Cod is inflamed, overmuch widened, or contracted; both which dispositions, are inconvenient, and hinderful to life and Generation.

Rhexosis. The Laxity thereof, is termed *Rhexosis*; Howbeit, it is naturally more lax on the left side, whether by reason of the weight of the left Testicle, or by reason of the weakness, and coldness of the left side.

Diseases of the Stones in Situation. The Stones are faulty in point of Situation, while they lie out of sight in the belly, or when they are in the Groyns. By reason of the former Situation, in questions of Divorce, men are pronounced impotent, though strong otherwise, because the Stones are not in their Natural place.

Number. By reason of ill Conformation in the Womb, they are faulty in point of number, when there is but one, or when there are three, as in those who are called *Triorches*, who are by some thought to be very lecherous; which fault goes in some Families from Father to Son, and therefore it is a Disease.

Figure. They are faulty in shape, when they are uneven, by reason of the swelling, relaxation, or divulsion of the *Epididymis*.

Color. If there be a fault in the Color, there is a fault in the Substance, which ought to be pretty solid; when it is over-flaggy, and soft, it is faulty. If the Stones exceed

Greatness the greatness of an Hens Egg, they are never the better, because they are liable to fluxions: and being swollen, or altered in their temper, they cannot rightly perform

and opening Herbs, the steam whereof, the Patient must receive into her Womb. Also Fomentations must be applied to the *Os Sacrum*, and the lower part of the Belly, and good Diet appointed, not heating, but attenuating and opening.

The Action of the Womb, is Conception; if it be abolished, the Patient is barren: Which barrenness, depends either upon the distemper of the womb, or upon the ill shape thereof, or the hardness of the inner Orifice, or the distortion thereof, or from fault of the Stones, and Spermatick Vessels, in which somewhat is wanting, either in point of structure, or of matter: and if a woman be sickly, she cannot make good Seed fitting to cause a Conception, til she recover the soundness of her health, and til the faults of her womb (if not incurable) shal be amended.

Symptoms in the Actions hurt. Sterilitie

But forasmuch as the Womb is ordained, not only for Conception, but to evacuate the Superfluity of Natural Humors in the Body, such as are, superfluous Seed, and Menstrual blood: if they be totally, or in part suppressed, the woman cannot be in Health, nor if they flow too much. Hence comes the *Gonorrhœa simplex* [simple running of the Reins] or the Feminine Flux, either of blood, or Humoral, when only Humors come away: which last, if it be malignant, and the Humor be sharp, exulcerating, and of evil color, it is dangerous, and comes sometimes from an outward, venomous, and contagious cause; and therefore women ought discreetly to be questioned touching that matter, that they may be brought to acknowledge their Disease, and not deceive the Physician under a pretence that they have the ordinary whites, to their own hurt, unless they acknowledge themselves faulty, or lay it upon their Husbands, whom it is better to accuse, if they be in any measure suspected, than to call the womans Chastity in question.

Suppression of blood or seed.

Over-great flux thereof.

Because we are treating of the Action of the Womb, which is Conception, I will speak a little touching the same, and shew, How a woman is disposed during Conception: What is the fruit, or work of Conception, *viz.* how the Infant comes out of the womb, and how the woman is constituted in the time of her Travel, and what happens unto her after her Travel, until she be wel, and upon her Legs again.

Touching other Diseases, whereunto she is subject, I will speak nothing, because they differ not from such of the same kind as she is troubled with, when she is not with Child.

Wherefore, as the Abolition, or taking away of the Action of the womb, is Barrenness; so the Action thereof being depraved, brings forth a Mole, or a false Conception, or an Efflux of the Seed, after eight daies, or Abortion.

Moles, Abortions, &c.

If the Conception be true, and legitimate, a Child is thereby begotten; for the Mans Seed being squirted into the ^a Sheath, is sucked, and retained by the ^b womb; and then the ^c internal Orifice being shut by its heat, and inbred vertue, it stirs up the forming Faculty of the Seed, and sets it on working: VWhereupon, of both Seeds mingled, the Child is framed; which is begun by a certain point, or little speck; which upon the third day is perceived to pant, in Eggs that a Hen sits upon. Afterward, certain Skins are formed, within which, the foundations, or first threds of the Vessels, and al parts, are drawn out of the Seed, and the woot, or super-structure, is produced out of the Menstrual blood, which comes upon it: and then the *Placenta* is made, being a Mass, or Lump of Flesh, termed also the ^d VVomb-Liver, which being glued to the sides of the VVomb, interposes it self between the ^e Navel-strings of the Child, and the Vessels of the Mothers womb, which before were joyned together.

The Childs Conception

Right Shaping

The Placenta or womb-liver.

Now the Conformation of the Infant, is different in the parts thereof; but the said difference, does more manifestly appear in the Vessels of the ^f Heart, which are united by a double Anastomosis, or Union of the mouths of the said Vessels, as I have described them, in my History of the Child in the Womb.

Some sickly VWomen, while they go with Child, have their health better than ordinary; but the Child fares the worse for it, because it sucks up the impurities of the Mothers blood. Others are worse at that time, because the impurity of the mass of blood, is carried into divers parts; and if it stick in the Stomach, it causes either strange longings, or frequent vomiting; in some, al the while they are big, in others

why some children are sickly, others not

thers, to the middle of the time of their Belly-bearing.

If a Woman, during the whol time of her Conception, can make the Child partake of her passions, it wil partake both of her Health and Sickness.

^a T. 7. f. 2. Y. ^b f. 2. K. f. 3. A. A. ^c f. 3. D. ^d T. 8. f. 3. A. A. ^e f. 2. A B C D G. ^f T. 9. f. 4. D

Whether a big-bellied woman may be let blood? Affir.

Whether or no, may we let blood, or purge a sick woman that is with Child? Blood may be taken away at any time, especially in the first months, in which the Child being smal, needs little blood to nourish it; but in other months also, blood is taken away, if the greatness of the Disease require it, to save both Mother and Child.

And if any ill happen after blood-letting in such a Case, it must be attributed rather to the violence of the Disease, than to the blood-letting, or any other Remedy applied.

Whether in the disease Cholera she may bleed? Neg.

But if a Woman with Child, be taken with the disease *Cholera* [a violent purging upwards and downwards of corrupt Humors] when she is in her seventh or eighth month; whether in such a case, is it safe to let her blood? If it be suspected as hurtful in such women as are not with Child, lest their strength being by much Evacuation weakened, should be more perished, and decayed, much less is it to be allowed in such as are big-bellied, who have suffered plentiful, and immoderate Evacuation out of their Veins; because it inclines the Patient to miscarry, while it defrauds the Child of its nutriment, and impoverishes the mother; so to go about to Cure a Woman with Child, is a dangerous, and unheard of Practice. For if al Practitioners dis-allow the same in Men, and Women not with Child, both Greeks, Arabians, and Latines, both Antient and Modern; much more is it to be dis-liked in a woman seven or eight months gone with Child. If it be done in a smal quantity, it is to no purpose: what can the taking away of one little Porren-ger of blood do, to resist the furious agitation of Humors, and to extinguish a Fever, seeing the blood is wont to come very slowly away, drop by drop, and the best first.

I say no more, lest I should seem with affectation to handle this Question, which shal be more accurately discussed in another place. He that desires to be acquainted with the Cure of Womens Diseases, let him read *Hippocrates* his fift Book of that Subject.

Whether in big-bellied women, the womb grows thinner? Neg.

It is worthy Observation, That the greater the Child grows in the VVomb, the more does the VVomb, and the *Placenta*, or VVomb-Cake, or VVomb-Liver encrease; so that neer the time of Travel, it is as thick as a mans Thumb, contrary to the Nature of other Bodies, which by how much the more they are distended, by so much the thinner they grow. If the thickness of the VVomb be less, either those VVomen are lean, or have little blood, or had a flux of blood a little before their Child-birth; and such do void little or no blood by way of the Child-bed Pur-gations.

The posture, & accommodation of the child in the womb.

Now the Child in the VVomb, lies round like a Foot-ball, floats in Water, being compassed with two ^a Membranes, the one called ^b *Amnion*, the other ^c *Chori-on*, has the ^d *Placenta*, or VVomb-Liver fastened to the sides of the VVomb, as a Mattress, or Bed to rest upon, in which the Mothers womb is purified, and in which the Unbilical, or Navel-Vessels are rooted, viz. ^e a Vein and two ^f Arteries, which carry blood to the Liver and Heart.

The *Vena Porta* has blood proper thereunto; and the *Cava* has also blood of its own, which must go unto the Heart to be circulated.

The Child in the womb, is nourished by the ^g Navel; it breaths a little, its Heart ^h moves, and exercises its vital Faculty, it feels, and is moved, and has been heard also to cry.

The Natural Birth.

At last, when it finds it self perfect, whether in the seventh, or in the ninth month, which is the ordinary time for a Child to be born, being impatient to be any longer there imprisoned, it breaks its bands, and prison doors, and seeking to come out,

The Cavity of the ^e Womb in Virgins and in those which have never conceived, is so smal as to contain only a pease or a very little bean; In such as have born Children, it is larger.

Cavity.

The Action of the womb is conception, or attracting the Seed, and reducing the same into Act, by causing the same to ferment and proceed to formation. And although this be that for which the Womb was ordained, yet it is by accident the *Sluce* or *Outlet* of Superfluous Humors in the Body, which do either continually flow unto this place, as in the *Whites*, or at certain seasons, as the *Menstruous Blood*, which being more than the woman needs for her Nourishment, is ordained to nourish the Child in the womb, and when it is born, it drops out of the Dugs in the form of Milk.

Action.

^a T. 7. f. 2. 22. f. 4. D D. ^b T. 7. f. 1. d. ^c T. 7. f. 1. e. ^d T. 7. f. 1. e
^e T. 7. f. 3. B B.

The Medicinal Consideration.

By our knowledge of the Natural Constitution of the *Genital Parts* of women we come more certainly to understand their departure from the said natural Constitution by several sorts of Infirmities.

Disorders of the.

The *Spermatick Vessels* are liable to obstructions, whereby the usual Flux of Humors is stopped, which is very hurtful to women.

Spermatick Vessels.

They swell together with the Stones, and become as big as a mans *Fist*, by a collection of Humors resembling Tallow or suet.

Stones.

This is known by a swelling in the bottom of the Belly at the sides.

The *Trumpet* or *Horn* of the Womb is widened and moved by Seed, which being there corrupted, seeks its passage out. But wonderful it is that the mans Seed should come thither, and that as *Histories* report, a Child should be conceived there. 'Tis very strang that a Child should be formed out of the Cavity of the womb; and it favours the Opinion of *Paracelsus* and *Anatus Lusitanus*, that a Child may be made in a Glass of a Mans Seed and menstrual blood, placed in Horses Dung, unless both of them, the one being an *Achieft* the other a *Jew*, were known to be *Impostors*.

Trumpet.

The womb is the Root, Seed plot and foundation of very near al womens Diseases, being either bred in the womb, or occasioned thereby.

womb it self.

If it be troubled with an hot distemper and inflamed, it causes intollerable burnings, the Feaver *Synochos* and the burning Feaver, very troubleisome Itchings; and finally it brings exulcerations, the *Cancer* and *Gangrana*.

Distemper.

If it be stung with fervent Lust, it becomes enraged, causes *Uterine fury* and *Madness*; wil not let the Patients rest, but invites them to shake and agitate their Loins, that they may be disburthened of their Seed; and at last, they become shameles and ask men to lie with them.

Somtime it is drawn out of its place towards the sides, and is carryed this way and that way, as far as the Ligaments and Connexions of the Womb wil give leave; and it wil rise directly to the Liver, Stomach and Midrif, that it may be moistened and fanned; it Causes Choaking and Stranglings, and raises terrible and violent motions and Convulsions in the Body.

Motion depraved.

In a word, the Womb is a furious Live-wight in a Live-wight, punnishing Poor women with many Sorrows.

Although *Hippocrates* hath written and *Fernelius* confirmed the same, that the womb like a Globe does rowle it self in the Cavity of the Belly; yet are they rather the *Horns* of the womb, which are receptacles of Seed Spirituous and hot or putrified, which being swelled do move themselves this way & that way, til they have shed their Seed into the Cavity of the Belly: which Seed being dispersed, brings very cruel pains and stretches the Belly, until the force of the Spirits be Evaporated: hence comes that same swelling of the Belly and stifling about the Midrif.

Sometimes

Suffocation

Sometimes malignant Vapors ascending from the Womb by the Veins^a and Arteries, unto the Lungs and Kernels of the Throat, may cause choaking and stifling: and the malignant vapor of the Seed being so pernicious, is violently darted into the Brain, and all parts of the Body, from the Womb, as from a Beast that spits poison.

Cancerous Scirrhus.

The Womb is but little when empty; but when it is filled with evil Humors, it swells above measure; and it has been seen to equal the Head of a new-born Child which is an incurable Infirmary, because it is a Cancerous Scirrhus, which is the worse for being tampered with by Medicines.

^a T. 7. f. 2. VVXX. =

Dropfie

Sometimes the Orifice of the Womb being closed, and firmly sealed up, Water flows out of the Belly into the Cavity thereof, and coming to a quantity, it brings the Dropfie of the Womb. Sometimes evil Humors are collected there, and by the force of Nature, do afterwards break forth. This often happens to Virgins, and others, from the suppression of their Courses, the internal Orifice being stopped, as I said before.

whether seed suppressed hurteth women?

The Womb is watered with a two-fold Humor, Seed, and Menstrual Blood; the suppression of both which, does many waies afflict Woman-kind, and the evacuation thereof, does them much good in many respects. Howbeit, we do not read in Hippocrates any where, that the retention of their Seed, is hurtful unto Women: he writes indeed, that the Womb being dry, does ascend to the superior parts to receive moisture (which Galen laughs at) and that it desires to receive the Mans Seed to moisten it self; and that therefore marriagable Virgins that are troubled with fits of the Mother, should be married, and have the carnal society of Men. And therefore he makes the retention, or over-great flux of the Courses, the only general cause of Womens Diseases, and saies that Women cannot be in Health, unless they play the Women, that is, void their Menstrual Blood. In case therefore, that a Woman, or a Virgin have her Courses stopt, whether or no may we hope by blood-letting, three or four times repeated from the Arm or Foot, to draw the blood unto the Womb? I remember the Story of a Woman in a Consumption, because of the stoppage of her Courses, from whom Galen drew blood in a large quantity.

what must be observed in letting blood to move the courses?

1 The sufficiency of matter.

That we may know to resolve this Question, three things are to be noted; The Matter, the Place, and the Expulsive Faculty. The Matter is Blood, which remains over, and above what was necessary to nourish a woman for a months time, which was ordained to conceive Child, and to nourish it being born: wherefore we must consider, whether the woman abound with blood, so that she has what to spare, and void forth; for if she want blood, by reason of some fore-going disease, or because she eats little, we are not to expect that she should have her Courses.

2 Fitnes of the place

The place through which it ought to flow, is the womb, with the Hypogastrick and Spermatick Veins: for these Vessels do contain the superfluous blood, until the due time appointed for this Purgation, and they send it forth either by the Cavity of the womb, or by the Spermatick Vessels, into the neck thereof. But if so be the Womb shall be dry, or hard, and the Spermatick Vessels and Veins obstructed, we cannot hope to procure the Courses to flow, by often blood-letting. And

3 Strength of the faculty

the Expulsive Faculty is not seated in the Genital Parts, which receive this blood, but depends upon the general strength of Nature, which thrusts this superfluous blood out of doors.

Medicaments, & other means to accomplish the Cure

These three things ought therefore to concur, that a woman may have her Courses, Matter, Place, and the Expulsive Faculty; and Medicaments ought to have a respect thereunto. A Vein is to be opened in the Foot, rather than in the Arm; Cupping-glasses must be applied without Scarrification to the inner part of the Thighs, above the Vessels: Convenient Purges must be given, with Apozemes that move Urine, attenuate, and open the mouths of the Veins. Pills of Steel, Mirrh, and Aloes, must sometimes be given, and Baths made to sit in: or a Vaporary must be used sometimes of blood-warm Water alone, and sometimes boyled with Hysterical and

out, makes its own way, with the Headⁱ foremost; and such an Egress is termed a Natural, and right fashion'd Birth.

Before that Nature begins to work, she moistens the waies before the Birth, with a Clammy, and gluish Humor. The internal Orifice of the womb, and the whole Sheath, which in the last months, do by little and little grow thick, are moistened with the same clammy, glutinous Humor, that they may easily be enlarged to such a wideness as shall be necessary for the going out of the Infant.

^a T. 8. f. 1. C C C C. ^b f. 2. E E. ^c f. 2. F E. f. 3. B B. ^d f. 3. A A. ^e f. 2. A. ^f f. 2. B B. ^g f. 2. D D. ^h T. 9. f. 3. B. T. 11. f. 4. ⁱ T. 8. f. 1. D.

That the Child be rightly born, it ought to come out with its Head first, and its Face towards the Mothers Breech, the Membranes being first broken, and the water run out: After the Child, the Secondine, or After-birth, must come forth, viz. the *Placenta Carnea*, or Womb-Liver, whole, and untorn. VVhen the Child is come forth, the Navel is tied^a a Thumbs breadth from the Skin, and after it is tied, it is cut off, leaving only another Thumbs breadth.

^a T. 9. f. 2. P.

The Infant being wiped and cleansed, with its Head gently pressed together, and closed, is delivered unto the Nurse. The Midwife takes care of the Mother, who is careful of her privy parts, being pained, and to recover her languishing strength.

If the Birth prove hard and painful, a Fever is raised, and the privy Parts are swelled, by laboring, and endeavoring in vain to bring forth the Child. Sometimes her strength fails her, and other whiles Convulsions do arise. Then is blood drawn from the Arm, and the Foot, and the Genital Parts are fomented with Emollient, and laxative Fomentations, and are anointed within with opening Oyls, and fresh Butter. The Patient is put into a bath of luke-warm water, and sharp Clysters are given, to provoke the womb to excretion: and the inferior parts are provoked by Aperitive, and provoking Potions to open themselves.

Finally: when all wil not do, and the woman has passed over two or three daies in these Torments, if she appear like to die, and ready to faint away, if tokens of a Gangrene in the Privities do appear, although we are not sure that the Infant is dead, it is drawn out with an Hook, that the Mothers life may be saved; it is better that one die, than two, and the life of the Mother is to be preferred before the life of the Child. The Mother ought not to die to save the Child, and therefore the *Cæsarean Section* [ripping the Child out of the Mothers Belly] ought not to be practised.

'Twas elegantly said by *Tertullian* in his Book *de Anima*, cap. 25. *Necessaria crudelitate trucidatur Infans matricida ni moriturus*; that is, It is a necessary kind of Cruelty, to kill that Child, which otherwise would kill its own Mother.

VVhen the Infant has broke prison, and escaped, if the *Placenta*, or After-birth do not follow, the Midwife must thrust her hand into the Cavity of the womb, and pul it away gently, lest the bottom of the womb be drawn down.

If in a woman dead presently after her Delivery, you view the privy Parts, you shall observe the Caruncles obliterated and defaced, the Nymphes much diminished, so that only some Rudiments of them, are to be seen, and the inmost Orifice so wide, that it wil receive a mans four fingers bended together.

The widening of those Parts to let out the Infant, and the straitening of them again, a while after, is an admirable work of Nature.

The wideness and thickness of the womb, are diminished by little and little, by the coming away of the Loches, or Child-bed Purgations, which is nothing but that blood squeezed out, which had been shut up between the Spongy sides of the womb. But if the largeness of the womb be not diminished, nor the blood evacuated, it putrefies,

what precedes the same.

what follows

Helps to further hard labor

Drawing the Infant out by an Hook.

Admirable power of Nature.

Child-bed Purgations what they are

also the Hemorrhoid Veins, which pass down all along the Loins into the Fundament; as also the Spermatick Vessels which swell with Spermatick Humor, which in their progress do send branches unto the Loines. In Women, the Womb with its Ligaments and Testicles may hurt the Loins, but especially in a Woman with Child, by reason of the weight of the Womb and Child. The Veins and Arteries of the *iliac* branches, which are spread abroad through the *Os Sacrum*, may vex the Loines.

^m f. L. A. A. &c. ⁿ f. 4. R. ^o T. 5. f. 1. B. C. f. 2. C. D. ^p f. 2. A. A. ^q f. 1. D. f. 2. F. ^r f. 1. E. f. 2. G. ^s T. 12. f. 1. and 4. ^t f. 6. 11. ^u T. 6. f. 1. 2. &c. ^x T. 7. f. 1. d. f. 2. R. T. &c. ^y f. 2. Q. Q. S. S. ^z f. 2. o. o. f. 4. A. A. ^a T. 12. f. 1. and 4. D. D.

Remote Parts

The remote Parts which hurt the Loines, are, the Liver by the *Vena Portæ*, and the Meintery, and the Head whilst it disburthens it self of its Superfluities into the Marrow of the Back according to *Hippocrates* in his Book de *Glandulis*. The Humor descends through the Cavity of the Spinal Marrow, as far as the Loines, and it cannot easily go farther, by reason that the Marrow of the Back is therein divided into a Million of Threads.

^a T. 4. f. 1. A. B. ^b f. 1. F. F. f. 6. the whole ^c f. 1. G. H. ^d T. 17. and 18. ^e T. 18. f. 5. A. ^f f. 5. o.

Common Causes of Pains.

We must also observe the common Causes of the Pains, which are frequently found in Pains of the Loines, as internal Rheumatismes or Fluxes of Humors, and external by the Veins, or an Humor between the Skin, which flows from the Head betwixt the Muscles and Flethy Membrane,

Often times the branches of the *Vena Cava* and *Aorta* do carry a Part of boiling and Superfluous Blood, out of the greater Channels into the Loines, which they Distill either in the Muscular Parts, or in the Membranous Parts, or in the marrow of the Back; which is the Cause that a Pallie follows the Colick, or an Arthritis degenerates into the Colick and the Colick is changed into the Sciatica. Also, outward Impostumes of the Kidneys, and passions of the Gut Colon being either distended or exulcerated, are Communicated to the Loines. within and without in the Loines may arise Tumors, Impostumes, and Ulcers, yea, and the Loins are distorted by flux of Rheum, or some swelling. Their Fibres are distended by the Cramp. Many times pains of the Loines are stirred up by external Causes, as a fall on the Back, or a blow with a thick Stick, or some other matter.

External Causes.

Certain places in *Hippocrates* expounded.

These things being premised and well understood, it is easie to explain very obscure places in *Hippocrates*, touching pains of the Loines, which you shall find in the Commentaries of *Duretus* upon the Colick Prognosticks of *Hippocrates*, and others collected together in the Commentaries of *Marmellus* upon *Hippocrates*, in the word *Lumbi*.

There are two kinds of Loine Symptoms: for some are in the Loines, and others spring from the Loines: both of them are by *Hippocrates* judged to be very stubborn and hard to deal with,

In his Colicks he hath pronounced absolutely and without exception, Such as have pains in their Loines are in a very bad condition. And in the same book, Declares which arise from pain of the Back, are hard to cure. And how will you understand those places, unless by a clear knowledge of the the Parts sending and Parts receiving, as I declared before.

Certain it is, if in the beginning of Diseases there be pain in the Loines, with heavyness and a Fever, Blood very hot or in great plenty is contained within the greater Vessels, which being more inflamed, if not timely prevented, may be carried into the Head or into the Lungs, from whence grievous Diseases may follow. In other places he does particularly explain the Causes of Lung pains.

If I should recite those places, I should fill twenty Leaves and upwards, wherefore I will take in my Sailes and dispatch all in a word. Pains of the Loines in acute Malignant Feavers or other Feavers in the beginning are dangerous: for they signify a great Tumult in the Blood, and irritation of Humor within the greater Vessels, which is much to be feared if a speedy course be not taken to prevent what may follow, by a plentiful blood letting, especially in the Feet, to hinder the recourse of the blood to the upper Parts of the Chest or Head, where it is wont to produce divers terrible and deadly Symptoms.

Danger of these pains in Feavers.

We ought therefore to be very fearful of pains in the Loines which persevere in Feavers, although Blood have been often let, because in the Region of the Belly, Humors lie extreme deep, which may take their course suddenly to some of the nobler Parts, if they be not diligently Purged forth.

And therefore to cure such like pains of the Loins, Hippocrates was wont to open the Veins of the Ham or Foot: which is confirmed by him, in his Coicks: the pains of the Loins proceed from abundance of blood there, and blood-lettings that are caused by pains of the Loins are large and plentiful. These things declare the necessity of blood-letting, when the Loins are pained with a Feaver.

Their cure.

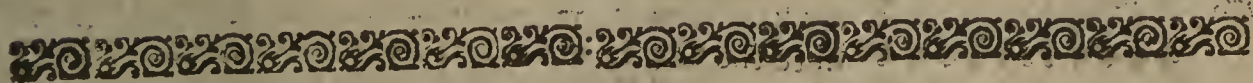
Purging must not be omitted that the Vault of the lower Belly being loaded with Excrements may be emptied and cleansed; out of Aphor. 20. Book 4. Though Hippocrates has written that such as complain of pains in their Loins, are looser bellyed than ordinary; that saying does not take away the necessity of Purging in these cases.

Bleeding at the Hemorrhoid Veins is good both for the Kidneis and for pains of the Loins; and therefore the Hemorrhoids are to be provoked.

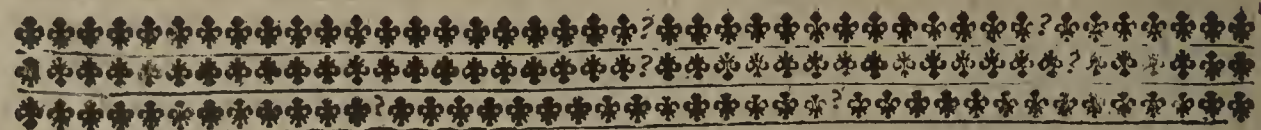
A lasting pain of the Loins without Heat or any Inflammatory disposition, unless it can be disscussed with Fomentations, after purging & blood-letting often repeated, the Humor must be drawn out with Cupping-Glasses and Scarification, and by Application of Vesicatories, or making Issues on each side of the Back-bone; also with a Bath of fresh water qualified with Herbs, or by sitting in natural Baths, or having their water Pumped from on high upon the Parts affected. For the pains of the Loins are more vehement and stubborn if the serous matter be contained within the Mutes as far as the Vertebrae: and they are yet worse and harder to be cured, if they come to the Marrow of the Back.

But those Symptoms which are thought to arise from the Loins, do not arise from the Parts which constitute or make up the Loins, but from the neighbouring Parts, which being spread upon the Loins, do cause pain, and transfer their Humors into other Parts, by a quick or slow motion, by the Veins and Arteries, such as are *Vena Cava* and *Aorta*, the Hemorrhoid Veins and the Melaraicks. Out of Galen.

The End of the Second Book:



THE



THE
THIRD BOOK
OF THE
ANATOMY
AND
PATHOLOGY
OF
John Riolanus,
THE
KINGS PROFESSOR
OF
PHYSICK.

Chap. 1. *Of the Chest.*

Its Bounds

ET us proceed unto the Parts of the Chest. Now the Chest is the Mansion House of the Vital Parts. It is bounded, and circumscribed below; by the ^abastard Ribs, and ^bMidrif; above by the ^cClavicula, and the whol Circumference, and bulk thereof is made up of al the ^dRibs, the *Vertebra's* of the ^eBack, and the ^fBreast-bone. And because the Neck comprehends the beginnings of certain Parts which belong unto the Chest, it is referred thereunto, rather than to the the Head, though it be the prop and Pillar thereof.

^a T. 10. f. 2. 11, 12, &c. ^b f. 1. 11. f. 6, 7, &c. ^c f. 1. f. T. 12. f. 1. *BB.*
^d T. 10. f. 1, 2, 3, &c. ^e f. 3. ^f f. 2. *AA.*

Shape.

That the Chest may be wel shaped, it ought to be of an Oval Figure, and not flat before, which is termed *Pectus Tabellatum*, a Table-shap'd Breast, and is a token that the Party so Breasted, wil fall into a Consumption.

The

The Chest is Compounded of divers Parts, which are divided into external and internal, that is to say into Parts containing, and Parts contained. The containing Parts are common and proper. The Common are five. The Scarf-Skin, the Skin, the fatty Membrane, the fleshy Membrane, and the Membrane common to the Muscles, which were explained in our Anatomy of the lower Belly:

Parts.

The Membrane of Fat and the fleshy Membrane have one thing proper and peculiar in the Chest, that they receive the Paps in Men and Women. In Men there are only the marks of Paps or Dugs, in Women they are Parts made not only for a feminine ornament, but to nourish the Infant, of which we are now to treat before we pass any further:

Chap. 2. *Of the Dugs of Women.*

THE Dugs are made up of a company of Kernels very like the Kernels of Prune-Stones, clustered together, and disposed confusedly in heapes upon a Membrane proper to themselves, in the midst of which there lies one Kernel greater than the rest, under the Teat.

Their Substance

The Dugs are placed upon the Breast, not to defend the Heart nor to adorn and beautify the Woman, but that the Infant may be more conveniently nourished, while the Mother embracing it in her Arms laies it to the Dug, and the Child Tickling her Nipple with its sucking provokes her the more to love it, and to express her Love by frequent Kisses.

Situation.

The largeness of the Dugs is different, according as the Woman is of a more or less fleshy and lascivious constitution of Body: for the lustful heat of the Womb does puff up and swell a Womans Dugs. In a Marriagable Virgin they become more large, if she enjoy carnal Embracements with more than ordinary pleasure and content,

Magnitude.

Nature, our bountiful Mother, has given a Woman two Dugs, that she may nurse two Children; or if one breast be sore, the other may serve the turn for a time. And for this Cause they communicate Vessels one with another.

Number.

The shape of the Dugs is not flat but bunching out, that they might contain the greater Quantity of Milk. At the end of the Dugs, are the Teats, out of which drops the Milk, which the Infant sucks.

Shape

The Teat or Nipple is made of the Skin drawn together and boarded with little holes. It is wrinkled on the out-side that the Infant may more easily lay hold upon it, and keep it in its Mouth.

The Teats.

Round about the Teat there goes a Ring or Circle of different Colors in Women, in respect of their Age and of their being with Child or not with Child &c. In Virgins it is red, in such as are devirginated it is Black and Blew. In Women with Child it is larger than ordinary; and if they go with a Boy it is Black and Blew or red; if they go with a Girl, it is of a whiteish Color.

The Circle about the Teats.

The Medicinal Consideration.

The largeness of the Chest is commended as sound and healthful; but a narrow Chest is blamed because it occasions shortness of Breath, because the Lungs are ill housed wanting Room to display themselves. The shape of the Chest ought diligently to be considered by a Physician when he sees any troubled with shortness of Breath. In healthy Persons, that the Chest may be perfectly shaped, it is requisite that it be round in the forepart and not sharp, and that it be streight before and behind; if it prove crooked, there is a fault in the Back-bone, of which we shall speak in our Doctrin of bones.

Mis-shapen Chest.

Terence blames the affected Care of Mothers who straitned the Chests of their young Daughters, that they might become Slender and smal in the waist. [Such are rightly termed Wasp-waisted Wenches, because they seem divided in the middle, like a Wasp or Bee.]

A misshapen

By Crooked-
ness of the
Back-bone.

A mis-shapen Chest by reason of the Crookedness of the Back-bone is more frequently seen in Women than in Men, because they are the weaker Vessels. These Crookednesses we endeavour to correct with a firm Pair of Bodies, made either of hard Leather, or of strong Linnen with Whale-bones sowed between, or of very thin Plates of Iron. Also the Back-bone is daily by contrary motions bowed the other way.

Some are born thus Mis-shapen, and they are incurable, let the Rectifiers of Crookedness do what they can.

Many times Rheumes fall upon the Muscles of the Back-bone, which draw the Vertebraes awry, whence proceeds a mis-shapen Breast-bone and consequently a Crooked Chest, because their shape depends upon the shape of the Back-bone.

By falling of
the Breast.

To the evil shaping of the Chest appertains the falling down of the Breast, or the bowing in of the Sword-like Gristle, which hurts the Stomach and provokes vomiting, and also shortness of Breath by hurting the Midriff; therefore this Gristle ought speedily to be lifted up and restored to its place. *Baptista Codronchus* and *Ludovicus Septalius* have treated of this Disease.

Empyema.

Drop sic.

The Diseases of the Cavity of the Chest are *Empyema*, or a collection of quitor within the said Cavity, and the Drop sic of the Breast: all which Diseases require a perforation to be made between the fourth and fifth Rib of the Chest on that side in which the Humor is contained.

Sometimes winds do so violently distend the Lungs, that the Patient is in danger of Choaking, unless the Chest be opened by the Perforation afore said, which is often practised at *Paris* to the great benefit of the Patients and easing of the Chest; although no watry Humors come forth, but only wind, which Issues violently, with a noise. Those whose Chests are distended with wind, are by *Hippocrates* termed *Pneumatiai*.

Condition of
the Dugs.

In a marriag-
able Virgin.

The Dugs are to be considered at divers seasons, in a Virgin Marriagable, in a Married Woman, in a woman with Child, and in one that lies in Child-bed and gives Suck: because in these several times they are subject to several Diseases. In ripe Virgins fully Marriagable, the Dugs are firm and solid. They become more soft and swelling, when they are transported with a burning desire of carnal Embracements: and by how much the higher they swell without pain, and the fuller Orbe that they make, strowting and Kissing one another, the greater is their desire after bodily Pleasures; and it may be guessed that they have tasted the Sweetness of Mans-Flesh.

In a married
woman.

If when the Dugs are pressed, Milk drop forth, it is a sign of the Parties being with Child, though *Hippocrates* accounts it but an uncertain Sign. The Dugs of a Married woman which were raised with the Ardency of fleshly lust, do sink and fall by little and little. Women that have large strouting Dugs are termed in Latine *Mammosæ Mulieres*, and they are of an hot Complexion, lustful and lovers of Wine and good Liquor. If they happen to be of a cold Complexion, the swelling of their Dugs; comes from an Wheyish Humor which they suck in like Sponges. So saies *Hippocrates*.

Inflammation
of the Dugs.
Impostum.

Scirrhus.

Cancer.

Large and ponderous Dugs, do hinder Breathing, by burthening the Chest. So the swelled Breaths of Ancient Virgins and married women, are liable to the same Diseases. For either by reason of a Flux of Humors or of some bruise, they are inflamed and impostumate: sometime they become Scirrhus and Knobbed as it were with the Kings-Evil, by reason of the Kernels; and then a Kernel or two, if they be movable, ought to be taken clean away, by cutting the Skin before they cleave to the Fat, the Disease encreasing and creeping on to infect other Kernels: Hence comes an incurable Cancer; Because the Dugs are full of Kernels and spongy, and therefore ordained by Nature to receive superfluous Humors. So that such Women as have them dried and shrunken up, are unhealthy and much troubled with spitting.

The Dugs of a Woman with Child, some time after her Conception, do swell by little and little, by reason of the flowing back of the Menstrual blood; and they drop a milky Whey: but in Child bed women, they become yet bigger, by reason of a greater afflux of blood; than the Dugs are able to contain. From this distention springs a Feaver, on the third day after they are delivered, which lasts a day or two, or longer; unless the Milk be forced back, or some Child suck the Dugs.

In a woman with child.

Distention by blood.

This Milk is called in Latine; *Colostrum*, and many are afraid to nourish the Child therewith. Yet *Spigelius* has proved, That this first Milk is no bad milk; and that a Mother ought not to refuse to nourish her Child therewith.

If in a Woman with Child, the Dugs are liable to *Inflammation*, *Tumors*, and *Ulcers*; much more are they so in a Child-bed Woman, and one that gives suck, by reason of the curdling of her Milk. *Dioscorides* writes; That the swelling of the Dugs is brought down, by the application of bruised Hemlock, which Experience shews to be true. Howbeit, *Dodonæus* approves not of this Medicine, by reason of the malignant, and venomous Nature of this Herb; which being applied unto the Dugs, may wrong the Heart.

In a woman that lies in.

Hippocrates in his *Epidemics*, has this Saying: If the Nipples of Womens Dugs, and that which is red in them, be pale, their Womb is diseased.

There is a great League, and fellow-feeling, between the Dugs, and the Womb, by reason of two Veins; viz. The *Vena^a Mammaria*, or Dug-Vein; and the *Vena^b Epigastrica*: and also by the *Vena^c Thoracica*, or Breast-Veins; which are Branches of the *Vena^d Cava*, which in the bottom of the Belly, affords the *Hypogastrick^e Vein* unto the Womb.

Consent of the womb & dugs, how caused?

The Ancient Chyrurgeons were wont to cut off Cancerous Dugs with the Incision Knife; but because it sucks not well, women are not willing to undergo so cruel a Remedy; neither do our Chyrurgeons practice it.

^a T. 2. f. 9. d. T. 12. f. 1. C C. ^b T. 2. f. 9. e. T. 12. f. 1. E E. ^c f. 1. 11 6 6. ^d f. 1. A B. &c. ^e f. 1. 5 5. ^f

Chap. 3. Of the External Parts of the Chest.

The proper Containing Parts are boney, musculous, or membranous. The boney Parts are of four sorts, viz. Twelve ^fRibs, two *Claviculae*, or ^sChannel-bones; the *Sternum*, or ^hBreast-bone, and the twelve *Vertebrae*, or ⁱturning Joynts of the Back-bone, of which we have spoken in our *Osteologia*, or History of the Bones.

Proper containing parts.

^f T. 10. f. 2. 1, 2, 3, &c. ^s f. 1. f. T. 21. f. 1. B B. ^h T. 10. f. 2. A A. ⁱ T. 10. f. 3. ^j

The Musculous parts, are either external, or internal; at least placed between the bones. The External musculous parts, are divided into Muscles proper to the Chest, or such as are referred to other parts; such as the *Musculus^a Pectoralis*, or Breast-Muscle; *Serratus^b minor anticus*, or the smaller fore-side Saw-Muscle; and the greater *Saw^c Muscle*, or *Serratus major*; the rest belong unto the Chest, of which we shall speak in our *Myologia*, or History of the Muscles.

The Internal musculous Parts are, the Intercostal Muscles, both ^dinternal, and ^eexternal; which are placed in the spaces between the Ribs, as their name imports.

^a T. 10. f. 1. A B. ^b f. 1. E. ^c f. 1. C D. ^d f. 1. H H. ^e f. 1. G G. ^f

Chap. 4. Of the Pleura, Mediastinum, and Pericardium.

That continued membranous Part which incloses all the internal parts of the Chest, and bestows Membranes upon every one of them, like the *Peritoneum*, ^f is

The Pleura, what it is.

is termed ^f *Pleura*; which being every where stretched out under all the Ribs, is firmly joyned to the bony Parts, and to the Midrif. Beacale of its thickness, it is accounted double; but it cannot be demonstrated to be so, without tearing.

In Diseases of the Chest, when it swells, its doubleness is easily separated. Being on either side reflexed unto the Back, and rising up unto the Breast-bone, it is ^h reduplicated, and makes the ⁱ *Mediastinum*, and leaves within it self a certain void space, full of threds, which also comprehends the Heart, and the *Pericardium*: it is nothing else, save a Production, or a doubling and folding of the *Mediastinum*.

The *Mediastinum*, what it is?

Its Cavity.

This Cavity of the *Mediastinum*, is diligently to be observed, as that which helps to form the voyce as an Eccho to bear back the sound: it does likewise separate the bulk of the Chest into two Cavities, and divide the Lungs one from another.

^f f. 5. A A. ^g f. 5. C C. ^h f. 4. B B. ⁱ f. 4. A A. ^j

The *Mediastinum* is fastened unto the *Claves*, and the *Midrif*, by reason of the *Pericardium*, which is circularly knit unto the ^a *Circulus Nervus*, and the Breast-bone; and by this Artifice, the *Mediastinum*, by help of the *Pericardium*, does hold the heart suspended, and becomes the band of the *Midrif* it self. Now the *Pericardium* is the Bag, or Case of the Heart, which contains a watery Humor to moisten the Heart, from which it is round about so far distant, as is requisite that the Heart may freely move it self. If the *Pericardium*, or Heart-case has no proper Coat of its own, yet it does at least borrow one from the *Mediastinum*, which compasseth it about. By reason of the neer conjunction of the one unto the other, the membranous substance is no thicker, than the Membrane of the *Mediastinum* in other places.

The *Pericardium*, what it is?

^a T. 10. f. 6. F F. f. 7. G G. ^b T. 11. f. 1. A. f. 2. A. ^c

The Medicinal Consideration.

Diseases of the Costal muscles, is

Because Contraries compared together, are the better understood, having seen the Natural Constitution of these Parts, let us now take a view of their Preternatural Dispositions, or Diseases.

The Muscles, as well those that are spread upon the Ribs, as those which are placed between the said Ribs, which are subject to divers Diseases, caused either by the Flux of Humors from other parts, or by Humors collected in, and about the said Muscles.

Pains of the sides.

How known from the Pleurisie.

They undergo divers Tumors, Inflammations, Impostumes, Rheumatick pains, springing from a ferous, or wheyish Humor; all which do produce sharp pains in the sides, with a Fever, and sometimes with a dry Cough, which imitate the Pleurisie; wherefore the difference must diligently be marked, lest we apply the same Remedies to these pains of the sides, which are proper to a Pleurisie.

Hippocrates has observed this Difference; and after him *Duretus*, the Ghost of *Hippocrates*, and his Faithful Interpreter: For every Pleurisie is a pain of the side; but every pain of the side, is not a Pleurisie, or at most, but a bastard Pleurisie.

How they differ in

But some will say, both Diseases require the same Cure in respect of blood-letting, because the passage is easie for the Humors to go from the external parts, unto the internal. I do not deny that blood is to be taken away, but not so much, and so often, as in a true Pleurisy. And therefore *Hippocrates* in a pain of the side, was wont first to make use of Fomentations, that he might try whether the pain was in the side, or in the ^c Membrane called *Pleura*; for a simple pain of the side is eased by Fomentations; but the Pleurisie is thereby enraged the more, in which there is a continual Fever, an Inflammation, a Cough, and a pricking pain of the side.

Scituation,

And therefore the pains of the side differ in Scituation, and in matter; because one is seated in the Membrane ^a *Pleura*, and the *Intercostal Muscles*; another in the greater Muscles, which are spread upon the Ribs, such as are the ^c *Pectoral Muscles*.

cle, the ^d *Serratus major*, and ^e *minor*, the ^f *Latissimus*, and the Muscles of the ^g Back.

They differ also in Matter, because wind, or wheyish Humors, or blood does insinuate it self into the greater external Muscles, and is carried likewise, or slips down from the Brain, by the Veins termed ^h *Thoracicae*, or Chest-Veins: But the Humor which does possess the Intercoastal Muscles, is brought by the final Branches of the *Vena Azygos*, or Vein without a Fellow, and does produce the true Pleur-relie.

Matter.

^a T. 10. f. 5. A A. ^b f. 1. G G. H H. ^c T. 10. f. 1. A B. ^d f. 1. C D. ^e T. 10. f. 1. E. ^f T. 14. f. 1. C C D D. ^g T. 14. f. 1, 2, &c. ^h T. 12. f. 1. ll. 00. ⁱ T. 12. f. 1. a a a &c. ^j

It is not necessary that the Humor be contained within the Membrane *Pleura*, because it is not capable, nor apt to receive the Flux when the pain begins; but the Humor being shed abroad into the space which is between the Muscles, and the *Pleura*, it becomes partaker of the pain, which is more sharp in the *Pleura* it self, by reason of its Nervous, or Sinewy Nature, than it is in the Musculous Flesh.

The Action of the Chest, is motion, ordained for Respiration; which motion, is governed by Muscles and Nerves which are subject to the Palsy and Convulsion. To the Convulsion of the Muscles of the Chest, does belong the stoppage of the breath, difficult breathing, and *Hippocrates* his double-stroak'd fetching in of the wind.

The Membrane *Pleura* being inflamed with a continual Fever, a pricking pain in the side, and a Cough, makes a *Pleurisie*, which some late Physicians do think, never lasts long, without a transmission of the Humor into the Lungs, which often cleave to the *Pleura*, yea, and that the Humor passes over by a *Metastasis* into the Lungs, and causes a *Peripneumonia*, or Inflammation of the Lungs.

whether there may be a Peripneumonia, or no?

Zecchius was the first that broached this Doctrine in his *Counsels*, building upon the Authority of *Hippocrates*; others did in their writings, confirm it by reasons, as *Vincentius Baronius*, in his Book de *Pleuropneumonia*. And this Combination of two Diseases of the Chest in one, they term *Pleuropneumonia*, that is, the Side-and-Lung-sickness; which thing I gave an hint of, before them, in my *Anthropography*, or Description of Mans Body, in the Chapter which treats of the Lungs. That place of *Hippocrates*, is worthy consideration, which many have undertaken to explain: I for my part do thus interpret the same.

Oft-times the Lungs in one, or both the sides, do cleave unto the Membrane which covers the Ribs: or if they do not cleave thereunto when the side is first inflamed; the Membrane *Pleura* being soaked, and made softer by the afflux of Humors, does sweat out a clammy wheyish Humor; so that the Lungs when breath is drawn in, filling the whol Chest, do at length stick unto the said membrane *Pleura*, and the cleaving is made the faster by the heat of the Fever. Neither does the motion of the Lungs hinder that same cleaving too aforesaid, because when the pain is en-created, the Patient breaths short for fear of augmenting the same, and so the Lungs are moved very little: whereupon the Lungs are fastened to the part pained, and then the Pleurisy turns into a *Peripneumonia*, or Inflammation of the Lungs, or both these Diseases are joyned together; and therefore there follows an ealy Expectoration, first of a bloody Humor, by reason of a light Exulceration both of the *Pleura*, and of the membrane of the Lungs, and then of the rest of the matter, which comes partly out of the side, partly from the Excrement of the Lungs Nutriments, or from the impurity of the mats of blood, passing by its circular motion through the Lungs: whence it is, that so great a quantity of a Cholerick and Flegmarick Humor flows, which is spit up with Coughing.

How it is caused, according to our Author.

But if the Lungs do not cleave to the side, the blood-watry Humor being shed into the Cavity of the Chest, and scarce ever drawn back again, there is bred an *Empyema*; which if it be not voided of it self, it must be let out by opening the side; which Operation sometimes lucks wel.

The difference of a Pleurisie, and Peripneumonia. So that according to the Doctrine of Hippocrates, whom Herophilus (as Cælius Aurelianus relates) and Cornelius Celsus do follow, there is a true Pleurisie, if there be joyned thereunto, an Inflammation of one side of the Lungs; if both sides be pained, it is a true Peripneumonia, or Universal Inflammation of the Lungs, because the whole Lungs are affected both in the right, and left side; and continually beating upon the Ribs, they are apt to infect them with the blood-watry Humor wherewith they abound. Wherefore the Pleurisy, and the Inflammation of the Lungs, are Diseases of a brotherly Kindred, which help one another to destroy the Patient, or to comfort him, according as the Constitution of the Lungs is weak or strong; and as they are assisted with Remedies, especially, liberal blood-letting.

Neither can the matter causing the Pleurisy, be transferred, or propagated by any other waies into the Lungs by any Metastasis, or Epigenesis. Howbeit, we see in dead bodies, the diseased Pleura ten times thicker than ordinary, which argues that the seat of the Disease was there. I deny not but that it may be communicated to the Lungs, and that the Pleurisie may degenerate into a Peripneumonia, or Inflammation of the Lungs, after the manner aforesaid.

On which side the blood is to be taken away in a Pleurisie? Touching blood-letting, there has been for an hundred and fifty yeers, an eager contention between the Modern Physitians of France, Italy, and Germany, from what part blood is to be drawn in a true Pleurisie, whether on the same side that is pained, or on the other side. At last, the Opinion of Hippocrates confirmed with the Authority of Galen, has prevailed, and got Victory over the Doctrine of the Arabian Physitians. The Physitians of Paris, and all true Artists, do follow Hippocrates; for they let blood on the Arm, of the same side which is pained. After three or four times letting blood in the Arm, for Revulsion sake, a Vein may be opened in the Foot; but the diseased side must be first disburdened.

Out of what Vein? In blood-letting, we chuse our Vein, because the Patient is sooner eased by opening the *a Basilica Vena*, if we consider the Rectitude of the Vessels by the Fibres: for this Vein is a continuation of the *b Axillary Trunk*, which produces the *c Chest-Vein*, which glides through the external parts of the Chest, and is joyned to the Extremities of the Solitary Vein called *Azygos*. This was formerly declared by Gordonius, a Physician of Montpelier. Ludovicus Duretus, has confirmed the same with Histories, in his Commentaries upon the Practice of Hollerius.

Diseases of the Mediastinum. The Mediastinum is subject to divers Diseases. Its Membranes are inflamed as in the Pleurisie, because of the near Neighborhood of the Heart, and the communion of substance with the Pericardium. The Quittor therein collected, makes an Impostume, which is drawn out by perforation of the Breast-bone, or by an Instrument fitted for that purpose. Winds also are sometimes shut up within the Cavity of these parts, which do vex, and torment the Chest, and pierce it through as it were.

Pericardium Inflamed, The Pericardium may also be inflamed, with much pain, and no little danger, because it is near the Heart; which therefore is subject to frequent Swounings; and then the pulse is quicker, the Fever stronger, the thirst more vehement than in the Pleurisie, or in the Inflammation of the Lungs.

Full of Humor Oftentimes abundance of moisture is collected therein, which causes Suffocation, and over-whelms the Heart. If thou canst not draw away the said moisture with such Medicines as purge wheyish Humors; what if you should boar an hole in the breast-bone, a Thumbs breadth distant from the Sword-like Gristle? because the Pericardium is there fastened, that the heart may hang pendulous. *A doubtful Cure, is better than certain Desperation: it is better to try a doubtful Remedy than none at all, where there is no hope of help, save in some extraordinary providence of God.*

Deficient of Humor. If there be no water at all in the Pericardium, the Heart pines away by little and little, as it has been observed in many Patients.

Worms. Certain it is, that Worms are bred in the Pericardium, which feed upon the Heart, and are destroyed by the use of Scordium. Petrus Salius Diversus has treated

treated of this Disease. Neither is it any absurdity, that worms should be found within the Ventracles of the Heart; howbeit they are bred in the *Vena Cava*, and come from thence into the Heart.

Seeing the Heart hangs upon the Breast-bone, it will not be unprofitable to apply Topick Medicaments, and Fomentations, whether hot or cold, made to strengthen the Heart, unto this part, according as the Disease wherewith the heart is troubled, shall require.

^a T. 24. f. 1. C C. ^b T. 12. f. 1. B B. ^c f. 1. ll. 00. ^d f. 1. a a a. ^e

Chap. 5. *Of the Midrif, or Diaphragma.*

THe Method of Dissection has brought us to the ^a Midrif, the principal Instrument of free Breathing, which separates the Chest from the Belly like a Partition wall, being tied to all the bastard Ribs, to two of the true Ribs, and to the Sword-like Gristle; and being on this manner obliquely stretched round about, it sends forth two ^b fleshy Productions somewhat longish, even to the utmost *Vertebra's* of the Loyns.

It is made up of Flesh, and a ^c Sinewy membrane, which is placed in the Centre thereof, the rest of its compass being fleshy, and of the Nature of ^d muscle. On that part which is towards the belly, it is covered with a membrane of the *Peritoneum*: on the other side, towards the Chest, it is compassed with the *Pleura*.

The Sinewy Circle is placed in the midst, to strengthen that part, that it may bear the point of the Heart beating thereupon, and that it may bear up the Liver: for the Liver hangs fastened to the *Diaphragma*, which is drawn upwards within the Chest, by help of the *Medastinum*: for the Figure of the *Diaphragma*, or midrif, towards the belly, is hollow, within the Chest, it is bunching out.

It receives ^a *Veins*, and ^b *Arteries*, termed *Phrenicæ*, from the *Cava*, and *Aorta*. It has two notable ^c *Nerves*, which taking their Rise between the fourth and fifth *Vertebra's* of the Neck, are inserted into the Sinewy Centre of the *Diaphragma*.

Seeing the midrif is a muscle of a peculiar Nature by it self, so that there is not such another in the whol Body, it has a perpetual motion like the Heart, if not so fast an one: for it is dilated and contracted; sometimes slowly, and softly; other whiles swiftly, and violently. Sometimes it is moved alone with slow and soft breathing, but more often with the Lungs, when the body is stirred with exercise; but in violent Respiration, it is compelled to follow the motion of the Chest.

Hippocrates calls the midrif, the *Fan* of the *Belly*, because by its motion of dilatation and contraction, descending and ascending, it fans both those Cavities.

Seeing therefore there are two parts of Respiration; Inspiration, and Expiration, it is worth our Enquiry in which part the midrif is moved. By motion I understand contraction.

In the Inspiration, on drawing in the wind, while it is brought unto a right line, that is to say, of hollow, is made streight, then the midrif is contracted. In the Expiration, or letting go of our breath, it is slackened, raiseth it self upwards, and of streight or even, becomes hollow. When it is moved alone, it directs our free Respiration, which is done by an insensible, and invisible motion of the Chest, while the whol body does rest in peace; otherwise, in violent fetching the breath, it follows the motion of the Chest, which is elevated, and depressed (as we see after running) not only by the Intercoastal muscles, but also by the greater muscles stretched out upon the Chest, and by the muscles of the *Abdomen*. In which case the midrif is haled, and forced to follow the violent motion of the Chest.

^a T. 10. f. 6. C C. ^b T. 10. f. 6. B B. ^c T. 10. f. 7. A B. ^d

Midrif

Situation.

Substance.

Shape.

Vessels.

Motion.

How it moves in Respiration.

The

The Medicinal Consideration.

- Its Diseases are.* The Midrife is sometimes Diseased of it self, sometimes by accident as Sympathising with the Diseases of other Parts,
- Distemper.* Of it self it is troubled with an hot or cold *Distemper*, also with *Inflammations* and *Impostumes*. And it communicates its disorders to other Parts neighbouring thereupon, and to the Brain, and upon this Account it is wont to cause a Phrenzy.
- Tumors.* *Fernelius* saw hard Tumors fixed in the Root of the Midrif, which wasted away the Patients by a slow Consumption, without any Phrenzy or other Dotage.
- Inflammation.* When the Midrife is *Inflamed*, an acute Feaver does begin to shew it self: under the short Ribs towards the Midrif a palpitation or panting is felt, the Hypochondria are drawn together by reason of the Membrane of the *Peritoneum*: the Breathing is unequal, sometimes swift, sometimes slow, sometimes great and sometimes little, and at length Convulsions happen.
- Wounds.* The Midrif being wounded causes the Patient to die laughing, if we beleive *Hippocrates*, *Pliny* and other later Physitians.
- Wounds inflicted upon the fleshy Part of the Midrif are not so dangerous and deadly, as those in the sinewy or Nervous Part, and therefore *Ulysses* (in *Homer*) intending to give the *Cyclops* a deadly wound, chose the place where the Liver is fastened unto the Midrif, as *Galen* has observed.
- In an univerfal Palsey of the whol Body the Midrif is affected, which is known by difficulty of breathing,

Chap. 6. Of the Lungs or Lights.

- Their Substance.* **T**He Lungs or Lights are the Instruments of breathing and framing the Voyce: to which end they are framed of a substance light, soft, Spungy, whitish without, and reddish within, interwoven with many Vessels which are spread through the whol substance thereof; such as are the *Bronchia* or ^a Pipes of the Wexand, and the Pipes of the *Vena* ^b *Arteriosa* and of the *Arteria* ^c *Venosa*, which go so in company, that the *Bronchia* or Wind-Pipes are interposed between the Veins and Arteries.
- Vessels.*
- Scituation.* The ^d Lungs are *Scituate* within the Chest, and do with the Heart fill up Both the Cavities thereof, while they are dilated to fetch in breath; but they leave the Chest Empty, while they are contracted to expel the sooty or superfluous breath.
- Motion.* These interchangable motions of the Lungs are perpetual and never cease from the beginning of our Life until we Breath our last.
- Division.* Nature has *Distinguished* the Lungs into two Parts, placed in the several Cavities of the Chest, and she has divided each Part into sundry Lobes, Laps, or Scollops, for the facility of motion and for their preservation, for by this means they do more easily spread abroad (as it were) their wings; and one Lap or Scollop being hurt or corrupted, the other may remain whol and sound.
- Shape.* If you take a diligent view of the Lungs after they are taken out of the Chest, you shal see that each Part of each Cavity does in its shape represent the form of an Oxes Hoofe, for it is cloven and convex or bunching out in the external Part, and hollow in that Part on which it touches the Back.
- Membrane.* It is girt about with a very thin ^e *Membrane*, which is manifestly porous and full of little holes, that being pressed and overburthened in suffocations, it may disburthen it self into the Cavity of the Chest, and also suck in again such Excrementitious moisture, as shal there at any time abound.

This

- This Bowel alone is nourished after another fashion than the rest of the Body, for it borrows its blood from the Heart, from whence it has Vessels and not from the *Vena Cava*. And therefore those Physicians are shamefully over teen who in Diseases of the Lungs, are wont to say that they are oppressed by an afflux of blood, shed thereinto by an innumerable company of Veins.

Peculiar manner of nourishment.

They cannot receive Humors from the Head unlest with coughing, so that where there is no cough, the Lungs are affected only by that blood which comes from the Heart.

The Medicinal Consideration.

The Lungs are extreamly necessary for the maintenance of Life, For we live so long as we Breathe, and no longer: Nor is it enough meerly to breathe we must breathe easily, or it wil go ill with our Heart and our whol body. For in Diseases, difficult breathing is of great moment, and was more regarded by Hippocrates than the pulse: And Galen composed three admirable Bookes of *Difficult Breathing*, according to the Doctrin of Hippocrates, howbeit they are obscure and not to be understood save by skilful Physicians and Anatomists.

Excellency of the Lungs.

I wil give you a little tast of them, after that I have laid open the Diseases of the Lungs.

Because the substance of the Lungs is soft and Spungy above that of the other Bowels, therefore it is more subject to Fluxions than the rest which flow either from the Brain, or from the Bowels, by way of the Heart.

why the Lungs are so subject to Fluxions.

They lie in the middle space between the Head and the Midriff, not only between the Hammer and the Anvil, as the Proverb is, but between two Hammers, where with they are beat upon and hurt on both sides: whil the Head distils upon the Lungs, and the Liver affords impure or over plentyful Blood unto the Heart, whicht the Heart spues and casts back into the Lungs, whereby they are infected and overwhelmed.

Which infection of the Lungs springs not from the Heart, but from the distempered and ill disposed Bowels; which suggest unto the Heart very impure blood, whose vitioulness the Heart is not able to correct, save after many Circulations.

In the mean whil the Lungs are greivously offended by the foresaid blood passing through the substance thereof, for they are subservient unto the Heart as it were in the Nature of an Emissary or Common-shore; whiles the filth of the Heart flowes unto the Lungs with the Blood, whereupon the Lungs are subject to sundry Diseases.

The chief Diseases of the Lungs.

For they are troubled with an hot or cold distemper, with a Cholerick and Flegmatick Tumor; and a frequent Inflammation called *Peripneumonia*, or at least with an inflammatory disposition; also with Impostumes and Ulcers, which bring the Consumption: for from spitting of Blood comes spitting of quiter, and from thence the Consumption.

Distemper. Inflammation. Consumption.

Also they are subject to a certain kind of Push or rising which in the end turnes into a secret milchievous Impostum termed *Vomica*, of which few escape.

Push. Vomica.

If the Quiter be derived from the Lungs into the Heart, unless it pass readily into the *Aorta*, it suddainly choakes or stifles the Patient. If it be carried into the right ventricle, it Causes the greater danger, because it cannot be so easily Purged out.

Furthermore the Lungs are obstructed in the *Asthma* either perpetual or coming by fits, which causes difficulty of breathing, which as it is more or less, is distinguished with different names. The lesser is termed *Dyspnea*; the greater, when the Pacien cannot breath save standing or sitting upright, is termed *Orthopnea*.

Asthma Its Kinds.

Often

cough

Oftentimes the Patient is vexed also with a cough, which is sometimes moderate and sometimes vehement, with great wheezing and ready to choak the Patient, which Springs from a cruel fierce *Catarrh* or sudden and plentyful *Defluxion*: Whereupon by reason of the extreme troublesomeness of the Cough which shakes the Lungs, there arises that disposition termed *Spadon Vasorum*, or a dilatation of the Vessels, being a dangerous and formidable sort of *Aneurisma*.

whether Blood-
letting is good
in these Cases?

In the *Peripneumonia* or Inflammation of the Lungs, there is no final dispute about Blood-letting, for it is written that Blood must be drawn from the common Veins. Now there is none of those Veins which are usually opened, that communicates with the Veins of the Lungs; neither are there any branches distributed from the *Vena Cava* into the Lungs: which has by *Galen* in many places been disputed against *Erasistratus*.

The motion likewise of Nature shewes the same: for whereas in Diseases of the Bowels and in burning Fevers the Crisis is wont to happen by bleeding at the Nose; in a *Peripneumonia* there is no such Crisis, because the Veins of the Nose from whence blood is wont to Issue, have no Communion with the Lungs.

Affirmed.

If it be true that Blood naturally does pass from the right Ventricle of the Heart unto the Lungs, that it may be brought into the left Ventricle, and from thence into the *Aorta*: and if the Circulation of the Blood be acknowledged, who sees not that in Diseases of the Lungs, the blood flows thither in greater quantity than ordinary; and oppresses the Lungs, unless it be first liberally taken away, and afterwards at several times, a little at a time be let out, to ease the said Lungs: which was the advice of *Hippocrates*, who when the Lungs were swelled, did take blood from all Parts of the Body, from the Head, Nose, Tongue, Armes, Feet; that the quantity thereof might be diminished, and the Course thereof drawn from the Lungs.

He himself in Diseases of the Lungs, bids us draw blood, till the Body were Blood-lets, and in one that had a Consumption, when he saw that the corruption of the Blood infected and corrupted the Lungs, he took away blood in so great a quantity, that the Patients body remained quite empty of the same, in a manner.

Supposing that the Blood circulates, the Lungs are easily emptied by Phlebotomy. If the Circulation be denied, I cannot see how blood may be from thence drawn back; for if it should flow back by the *Vena^a Arteriosa* into the *b* right Ventricle, the *c* Sigma shaped Valves do hinder it, and the *d* three forked little Valves, do hinder the recourse thereof, from the right Ventricle of the Heart into the *Vena Cava*. And therefore when the Veins of the Armes and Feet are opened, blood is drawn from the Lungs by reason of the Circulation thereof; and consequently the Opinion of *Fernelius* comes to nothing, namely that in Diseases of the Lungs, blood should be taken rather from the right Arm than the left; because the blood cannot return into the *Vena Cava*, save by breaking two doors and Bolts, placed in the Heart.

^a T. II. f. 2. E E G. ^b T. II. f. 3. D D. ^c T. II. f. 4. B B B. ^d T. II. f. 3. C C C.

Some Causes
of Consumption
of the Lungs.

Ulcers of the Lungs do often happen by reason of a fierce cough, caused by very sharpe Serosities, or by spitting of Blood: which if it come from an opening of the mouthes of the Veines by reason of Abundance of blood, it is not so much to be feared, as when it proceeds from eating asunder the Coats of the Veins, by the acrimony of Humors.

Nature

Nature in this case, out of Pitty, that our life might be preserved, has distinguished the Lungs into divers pipes and sundry Lobes, Laps or Scollups that the infection might not spread over the whol Body of the Lungs, which is usual in al continued or evenly united bodies. And therefore we see many that have Ulcers in their Lungs do live long, if they have but an indifferent Care of themselves.

why the Lungs are distinguished into Lobes or Laps.

If the Circulation of the blood be allowed, so that it passes often through the Lungs, & not through the *Septum Medium* or *Partition-Wal* of the Heart, we must maintain a two fold Circulation of the blood: the one is performed by the Heart and Lungs, whiles the blood spirting from the right Ventricle of the Heart is carried through the Lungs that it may come unto the left Ventricle of the Heart, (for it is squirted out of the Heart and returns thither again) the other is a longer Circulation, by which the blood flowing from the left Ventricle of the Heart, compasses the whole body by the Arteries and Veins, that it may return into the right Ventricle of the Heart. He that approves of one of these Circulations, cannot deny the other.

A twofold Circulation of the Blood.

The Lungs as it were do hang upon and are firmly fastned to the claves and the Brest-bone, for they do not depend or hang by the *Aspera Arteria*, for so in a violent Cough and when the Lungs are overburdened, the Wesand or Wind-pipe and Parts fastened thereunto would be torn in peices. Howbeit the Lungs and Heart being inflamed (according to *Hippocrates*) if the Lungs fall to one side, the Patient faints away, lies Cold and senseless and dies within the third or fourth day. If the Heart be not inflamed, the Patient lives longer, and some escape.

Seeing the Substance of the Lungs ought to be light and soft to Facilitate respiration; and in old, People it becomes dry and hard, either through the dryness of their temper, or by being filled with Flegm: this is the reason of that shortness of Breath we see in Old Men, which ushers them to their Grave.

why Old People are short Breathed.

Chap. 7. Of Respiration, or fetching of Breath.

The proper action of the Lungs is breathing: which we must consider how it ought to be in bodies that are in health, that we may discern faults thereof, when it is depraved. In our whole Practice, especially if you regard acute Diseases, there is no Disease or Symptom so usual as difficulty in breathing. It is well for the Patient, if in al Diseases, especially acute ones, he breath easily, because life is inseparable from Respiration, according to *Galen* in his 6. Book of the Parts Diseased. And if with al the Patient Sleeps kindly and sweetly, and feels no pain in the noble Parts of his body, it is to be hoped the Disease wil end well, because *Hippocrates* never knew any one die, in whom these three conditions were found.

Necessity of Respiration.

Now Respiration or breathing is twofold, free, or forced, free is that whereby the Air is gently drawn in and Issued out, without any remarkable motion of the Chest. And this depends only upon the Midriff, the Ribbs and whol Chest never moving: unless haply the lower bastard Ribbs are gently stirred; and this kind of breathing is truly natural.

Its twofold.

Free,

and

Forced.

The second sort of breathing, which is forced and violent: is partly natural, partly against Nature. Natural, when it depends upon our own power, so that we can make it quicker or slower, as when we puff out our wind with a long blast, and when we hold our breath. It is against Nature, when it depends not upon our wil, but upon the violence of the Disease. In this kind of Respiration the whol Chest is moved by al the Muscles, and the Midriff, to avoid the oppression and suffocation of the Lungs and Heart, which desire Air to cool them, and that their smoaky Sooty Vapours may be expelled.

Parts of Natural respiration

Inspiration
Expiration

There are two parts of Natural Respiration ; *Inspiration*, and *Expiration*. *Inspiration* is caused by drawing in the Air, and the dilatation of the Chest by the Ascent thereof : *Expiration*, is a breathing out of fuliginous, or sooty Vapors, the Chest being drawn together by the descent thereof. Between these two actions, is interposed a two-fold Pause, or Rest, viz. The space between the drawing in, and blowing out of the breath ; and the like space between the blowing out of the breath, and the drawing it in again, as in the Pulse there is a two-fold Rest, termed *Perisystole*.

Its three Organs.

In Respiration, or breathing, *Galen* writes that three Organs are to be considered : The Principal Mover, viz. the Heart ; The Secondary Movers, namely, the Muscles ; and the Things moved, viz. the Chest and Lungs. The Organs by which the motion is performed, are the Animal Spirits, and the Nerves.

wherein Natural Respiration consists.

Now that unnatural, and disordered breathing, may be discerned, we must principally learn to know, wherein the Natural manner of fetching breath, does consist, viz. In the moderation, and equability of Inspiration, and Expiration, and of those things whereby Respiration is performed.

Now these are four ; Motion, Rest, that which is moved, and that which by the motion, is drawn in, and carried forth. That Respiration will therefore be moderate, wherein we shall observe a Mediocrity of motion and Rest, and of the distention of the Chest, and of the matter it self, which is drawn in, and breathed out, and wherein Persons in Health appear no waies changed from what they were wont to be.

Differences of unnatural Respiration.

And this Natural Respiration ought to be the Rule of the contrary, which is not natural, viz. of the hurt Respiration, and of that which is in moderate. Now Respiration is hurt as many waies as there are parts which make up Natural Respiration, viz. Motion, Rest, Swiftnes, or Slowness. So that the hurts of Respiration, are these following, namely, Defections from Natural Motion ; Rarity, and Frequency of the Rest ; Greatness, and Smallness of Inspiration and Expiration ; Plenty, and penury of the matter drawn in, or breathed out, with cold, or heat.

Wherefore al difficulty of breathing, consists in Magnitude, or Paucity ; Frequency, or Rarity ; Swiftnes, or Slowness ; and consequently, Respiration is said to be faulty, when it is too great, or too little ; too slow, or too swift ; too frequent, or too rare ; too hot, or too cold.

Also these Defections, as wel in excess, as defect, are to be considered, either in both parts of Respiration, or in one alone ; also some are little without, and great within ; others great without, and little within : and some are great, swift, and frequent ; others contrarily, are little, seldom, and slow ; and some are doubled, both in drawing, and rendring back the breath. These are the Compound Differences of Respiration hurt.

whether Perspiration may supply the use of Respiration?

If Respiration fail, the Question is, Whether Perspiration can supply the defect thereof ? *Galen* saies it may, and he describes Perspiration, to be an evacuation of Spirit, or Air, by the Arteries which are dispersed into the Habit of the Body, by receiving in of Air, and expelling fuliginous Vapors. For *Hippocrates* has written that the whol body is perspirable, within and without. And the Author of Transpiration, or Perspiration, is counted to be the Heart, the Instruments are the Arteries ; the Pores of the Skin, are the Passages by which the Transpiration is made.

But I very much doubt, whether Perspiration can supply the Office of Respiration for a time, the Heart not being moved, because I cannot perswade my self, that the Air can pass so far as the Heart, by the smal Arteries, unless they did gape very wide, seeing it would meet with the Arterial blood, to stop its course. The Arteries may indeed expel the sooty vapors of their blood, but it is hard for them to draw the Air in again.

And if Perspiration be hindred by suppression of the smoaky vapors, then putrid Feavers are wont to arise ; as *Galen* has observed in Book 11. of his Method. In which

which case, blood-letting is good for Ventilation, and must be repeated, if need be.

Unnatural Respiration, is sometimes necessary in those that have their Health, to expel noaky vapors by forcible blowing out of the breath; or to expel the Excrements of the Bells, or to force out a Child by holding the breath. Exufflation, or forcible puffing out of the breath, answers to Expiration; and holding of the breath is a long Inspiration, as much as the party is able to endure, for some necessary use; and it is performed (which is strange) by one very smal muscle, which shuts the *Arythenois*, and the *Glottis*.

Unnatural Respiration sometimes necessary in healthy persons.

Chap. 8. Of the Heart.

THE Heart is the Principal, and most Noble Bowel of the whol Body, the Fountain of Life-giving Nectar; by the Influx whereof, the vitality, or lively force of al the parts, is recreated, and cherishd; *It is the first that lives, and the last that dies*: by the benefit whereof, al the parts of the body do live, and subsist.

Nobility of the Heart.

And therefore it is, that Nature has framed this principal Part with admirable Workmanship, both without and within, of a fleshy substance, strong, and thick, interwoven with al sorts of Fibres, and because it is the Seat of Native Heat, lest it should become dry, and parched up, she has moistened it with fat placed round about, and watered the same by circumfution of a wheyish Liquor.

Its Substance

^a T. 11. f. 4 B. —

It is scituate in the middle of the Chest, hanging by the ^a *Mediastinum*, and ^b *Pericardium*. For those two parts do joyn in this Office, as hath been said in our Chapter of the *Mediastinum*.

Its Scitnation.

The Heart is alwaies of the same greatness; in some strong men it is more smal and solid, than ordinary: in feeblie Persons it is greater, and of a looser substance, as in some men, and frequently in women.

Bigneß

It is shaped like a *Pine-Apple*: having a broad bottom, and growing pointed towards the top. The broad end is called the *Basir*, or *b*ttom, which receives four Vessels; the *Vena cava*, running through the Breast, and opened neer the Heart, and fastened thereunto; the *Vena Arteriosa*; the *Aorta*; and the *Arteria Venosa*.

Shape

Vessels.

In the *Basir* we find little Cases, or Covers placed by the Vessels, which carry blood into the Heart: They are called *Auriculæ Cordis*, the *Ears* of the Heart, and are hollow. In grown persons, the right Ear is larger than the left: but in the child in the womb, and al Infants, the left Ear is larger than the right.

Ears.

The other end of the Heart is termed the *Conus*, or pointed end. There appear Veins and Arteries ^h creeping upon the surface of the Heart, which seem ordained to repair the Fat as it ^hpende.

Before we proceed to the inner Structure of the Heart, we are to consider how it is moved: For its Action is Motion, or Pulation; because look what blood it receives in, it drives the same out by pulsation.

Action, viz. the pulse.

There are therefore two parts of the Hearts motion; *Systole*, and *Diafsole*; or Contraction, and Dilatation: when it takes in blood, it is dilated or widened; when it expels the same, it is contracted, or drawn together: between both which motions, there intercedes a pause, or resting time, which is termed *Perr-Systole*. How these motions are caused, is a doubtful Question.

Systole. Diafsole.

^a T. 11. f. 4. A A. — ^b 1. 11. f. 1. A. — ^c T. 11. f. 1 C. — ^d f. 2. E E. G. — ^e f. 1. M. f. 2. C. — ^f f. 2. H H. — ^g f. 4. C C. — ^h f. 2. by B. —

Rejecting the various Opinions of others, I wil tel you how I conceive this motion is performed. It is probable, that the Heart being widened, cannot receive the blood,

Cause of the pulse, according to our Author.

blood, unless its dilatation be made by drawing back the *Basis* thereof to the *Cone*, that the *Vessels* may shed their blood, and the heart draw the same to it self. In the *Systole* the heart is contracted, and the blood received; is thrust out; and then the Heart becomes narrower, and longer than it was before. And because it is shut up in the *Pericardium*, or Heart-case, which is fastened circular-wise to the Sinewy Centre of the *Midrif*, with its *Cone*, or pointed end, it limits the Nervy Centre of the *Midrif*, and with its *Basis*, or broad end, and the *Aorta* sticking out, it limits the Breast at the same instant, when it is extended, and prolonged.

How necessary the circulation of the blood is to continue the motion of the Heart. This perpetual motion of the Heart, though it depend in respect of its production, upon the inbred faculty thereof, yet can it not alwaies continue, save by the coming in of blood, out of which, the Heart frames the vital Spirit: and in case at every pulse the Heart receive one drop of blood, or two, which it casts into the *Aorta*, and that in an hours space, the Heart pulses two thousand times, it must needs be, that a great quantity of blood, or al the blood in the *Vessels*, should pass through the Heart within the space of twelve or fifteen hours.

Now this quantity may come to fifteen, or twenty pounds of blood, which is as much as is contained in the *Vessels*, and therefore it must needs be that in the space of twenty four hours, the whol mass of Blood is twice or thrice passed through the Heart, according as the motion of the Heart is quicker, or slower.

whether the blood do pass from the right Ventricle of the Heart unto the Lungs. And that this *Circular Motion* of the blood, might be performed with the greater commodity, and facility, *William Harvey*, an *Englishman*, the *Kings Physician*, the Author and Inventor of this motion of the blood; and *Joannes Walaeus*, a Professor of *Leyden*, and most eager Defender, and Protector thereof, will have the blood to be carried through the Lungs, from the right, unto the left Ventricle of the Heart, not allowing that it should pass through the *Septum*, or Partition wall between the Ventricles of the Heart; and that the whol mass of Blood, in an hour, or two hours space, is circulated through the Heart, and the whol Body: which I do not allow of, and I have els-where laid down my reasons of the impossibility, and inconveniency of such a motion.

The Heart is the Original of Vena Cava. When I had observed that the Trunk of the *Vena Cava* was separated from the Liver, running continually from the *Jugulum*, to the *Os Sacrum*, without any interruption, and that it passed not through the Liver, as we may see with our Eyes, and perceive also by thrusting a smal stick thereinto; I came to be of Opinion, that the *Vena Cava* did spring from the Heart, as the *Vena Porta* takes its rite from the Liver; and that two sorts of blood were contained in those Veins, though both of those sorts are labored, and wrought in the Liver: the one of these sorts of blood being sent into the *Porta*, the other by a branch rooted in the Liver, twice as smal as the Trunk of *Vena Cava*, carried unto the Heart.

The Liver of Vena Porta. They have different blood in them. The blood which is contained in the *Vena Porta*, is not circulated, although it have a flux, and reflux within its own Channels, and communicate with the *Cæliacal Arteries*, which are joyned one to another by mutual *Anastomoses*.

what kind of blood is circulated? Within those *Vessels*, the blood may pass to and fro reciprocally; but it does not run out according to the longitude of the body; neither is it in such a sense circulated.

In what Vessels? And therefore the Circulation which is made in the Heart, does borrow its matter from the Liver by the *Vena Cava*. The *Circulatory Vessels*, are the *Aorta*, and *Cava*; neither do their branches receive that Circulation, because the blood being shed into al the parts of the second and third Region, does remain there to nourish the said parts; neither does it flow back unto the greater *Vessels*, unless it be revealed by force, when there is great want of blood in the larger *Vessels*, or when it is stimulated into some violent motion, and so flows unto the greater *Circulatory Vessels*.

After what manner? And so the blood which is brought from the Liver unto the right Ventricle of the Heart, does pass through the Partition wall of the two Ventricles, into the left Ventricle.

I confess that in a violent Circulation the blood is carried through the Lungs unto the left ventricle of the Heart, where it is forcibly ejected into the Aorta, that it may afterwards be carried into the greater Veins of the Limbs, which communicate by mutual Anastomoses with the Arteries; and then from the Veins it flows up into the right Ventricle of the Heart, and so there is made a perfect Circulation, by the continual flux and reflux of the blood.

How the circulation is performed?

So that the blood in the Veins, does naturally, and perpetually ascend, or return unto the Heart, the blood of the Arteries naturally, and continually descends, or departs from the Heart.

Howbeit, if the smaller Veins of the Arms and Legs, shal be emptied of blood, the blood of the Veins may descend to succeed in the place of that which is taken away, as I have cleerly demonstrated against *Harvey*, and *Waleus*.

No man can deny the mutual Anastomoses of the Veins and Arteries, seeing that *Galen* has said it, and demonstrated the same by Experiments, and our dayly Experience confirms the same.

Hippocrates himself, in his third Book of the Joynts, takes notice of this communion of the Veins and Arteries, in a Discourse by it self.

You see how necessary it is for the blood to circulate, that the motion of the Heart may not cease; and how this Circulation may be performed without confusion, and perturbation of the Humors, and without destroying the Ancient Art of Healing.

How necessary the circulation of the blood is.

And therefore the Circular motion of the blood is necessary, to continue the motion of the heart; as in Mills, the Water must perpetually fall upon the Wheel to make it turn about; also to warm again, and restore the strength of the blood, which is decayed by the loss of Spirits dispersed up and down the body; whereas in the Heart, it is refurnished with new Spirits: and that the Heart being the Fountain of Native Heat, may be moistened with a perpetual Dew, lest by little and little, it should parch, and wither away, for want of that dewy moisture, or Life-giving Nectar.

The Utility thereof.

By the Circulation of the blood in the Heart, the Causes of Life and Death, are more easily declared, than by the *Humidum Primigenium*, or Original Moisture bred in the Heart when the Child is formed; which is so little that it is soon consumed, and the perpetual motion of the Heart continuing day and night without ceasing, would at length wear away the Substance of the Heart, unless by a perpetual flowing in of the circulated blood, it were moistened, and repaired.

Howbeit, we must hold that the Heart and Arteries do move by Course, one after another, not being moved at the same instant with the same kind of motion; but taking their turns, and performing their work interchangeably; for when the Heart sends out the blood, the Arteries receive it, and transmit it into the Veins; not that which is expelled the same instant, but that which is nearest the Veins.

whether the Heart and Arteries are moved at the same time?

This being granted, these parts must of necessity be moved one after another, and the swelling motion of the Artery when it rises under our Finger, is dilatation, or widening, and not contraction; although it seem very like the pulse which the Heart makes, when it contracts it self.

Having explained the Circulation of the Blood, we must now open the Heart, which you shal see divided into two Ventricles by the *Septum Medianum*, or Middle Partition: The one is termed the ^b Right Ventricle, being the wider and softer: The other the ^c Left, being harder, narrower, and compassed with a thicker wal, reaching as far as the Cone, or Point of the Heart, which the Right does not. The Right Ventricle receives the *Vena* ^d *Cava*, and the *Vena* ^e *Arteriosa*. The *Cava* pours blood into the Heart; the *Vena Arteriosa* carries back all, or a part thereof into the Lungs.

The right Ventricle of the Heart.

Its Vessels.

To the Orifices of the *Cava*, are adjoynd certain three-pointed ^f Valves, or Shutters, which hinder the going back of the blood. The Orifice of the *Vena Arteriosa*,

Their Valves.

teriosa,

teriosa, is compassed with three *Valves*, or *Shutters*, shaped like an old-fashioned Greek *Sigma*, which hinder the reflux of the blood.

^a T. 11. f. 3. D D. ^b f. 3. C C. f. 3. D D. f. 4. C C. ^c f. 3. P. f. 5. C C. f. 6. D D. ^d f. 1. C. f. 4. E. ^e f. 2. E E G. f. 4. A. T. 12. f. 3 all ^f T. 11. f. 3. C C C. ^g f. 4. B B B. ^h

The left Ventricle of the Heart.
Its Vessels.

The Left Ventricle receives two Arterial Vessels, the ^a *Aorta*, and the *Arteria Venosa*. Which latter, according to the Doctrine of some Anatomists, carries blood from the Lungs into the left Ventricle of the Heart, or carries Air prepared in the Lungs, into the said Ventricle, and likewise carries back fuliginous Vapors; howbeit, many do not allow the said use.

Their Valves

The *Arteria Venosa* hath in its Orifice, only two ^c three-pointed *Valves*, or *Shutters*. The *Aorta* carries back Arterial blood out of the left Ventricle of the Heart, and its Orifice is stopped by three ^d *Sigma* shaped *Valves*, or *Shutters*, which hinder the blood from returning back again.

It is to be observed that these three-pointed *Valves*, or *Shutters*; are membranous neer their Vessels; but they depend upon fleshy Pillars, which within the Heart are like unto Muscles, being fastened to the sides of the partition wall, or *Septum* of the Heart, which remains unmovable, saving towards the Basis, where it is softer, and gives way a little, when the Basis is drawn back, in the *Diastrale*, or Dilatation of the Heart.

The Septum Medium of the Heart.

Whether the blood pass through it, or no?

The *Septum* ^e *medium*, or *Partition-wall* of the Heart is porous, full of little holes, which are sometimes manifestly discerned towards the *Cone*, or Point of the Heart. It is more probable, according to the Doctrine of Galen, that the blood does naturally pass through the said *Septum*, or partition wall, than through the Lungs. Howbeit, I deny not, but that in the violent Agitation of the Heart and Lungs, the blood is carried through the midst of the said Lungs.

^a T. 11. f. 1. M. f. 2. C. f. 5. A. ^b f. 2. H H. f. 6. A. T. 1. e. f. 6. all ^c T. 11. f. 6. C C. ^d f. 5. B B B. ^e f. 3. O D D.

The Medicinal Consideration.

Usual Diseases of the Heart, are,

Having finished these Observations, I proceed unto the Diseases of the Heart. The Heart (as Pliny saies) cannot endure long Diseases, nor suffer long torments. And Galen tells us, That Physicians have not been able to find out, or invent Medicines able to cure an evil, and malignant distemper which has taken hold of the substance of the Heart. Wherefore this part is diligently to be preserved, which suffers not by its own fault, but by the Impurities of other parts wherewith it is infected and corrupted.

Swourning

Fainting.

Wherefore, if the Heart be supplied with pure, and good blood, and be not infected by contagion of the neighboring parts, the Lungs, and the Liver, it flourishes most cheerfully, and causes a very long life. But by our Intemperance we suffer it not to continue in Health for the good of the whole Body. And therefore it is exercised with divers Diseases, by the loss of strength, that is to say, of Spirits, or by their Dissipation; such as are *Syncope*, and *Leipothymia*, or swooning and fainting away, which differ only in degrees; *Syncope* being greater than *Leipothymia*.

Oftentimes the Heart does counterfeit, and make shew of a kind of Apoplexy, but without inorting; neither does it leave a Palsy after it, or any feebleness of Body, or mind. If this Disease return often with violence, at length it overwhelms and stifles the Heart, not only because the blood is stopped from going forth, by reason of the fulness of the Vessels, but by the Hearts being oppressed by some gross substance of the blood, forcibly crowded into the Ventricles of the Heart, stopping the pulsative motion of the Heart and Arteries, and causing sometime that the Patient cannot speak, and bringing him finally to his Grave.

This Disease is as common among the Germans, as is the Apoplexy, by reason of their full, and Champion-like habit of body, contracted by their daily Feasting, and liberal drinking, especially at dinner, which lasts till within

within Night, they in the mean time taking no care to abate their Plethorick habit by liberal blood-letting. Nor is it any wonder, if from so great plenty of blood, they fall into an Apoplexy, or the Heart-swoonings aforesaid. Hence depends the Explication of the 42. Aphorism of the Second book.

The motion of the Heart is depraved in the Palpitation, or Panting thereof, and it is interrupted in *Syncope*, and *Leipothymia*. Palpitation

The Ventracles, and Partition, are oftentimes obstructed, being filled with little bits of Flesh or Fat, wherewith the Heart is choaked, the Circular motion of the blood being stopped. Sometimes they stick in the right Ear of the Heart: whence follows Palpitation, or inequality, or Interception of the Pulse. The Circulation intercepted by obstruction of the Ventracles,

Worms are also bred in the Heart, of which *Salvus* treats. There is a memorable Story of a certain English man, whose Heart was eaten into by a Worm. You may read the Story in *Aurelius Severinus*. Or of

The Circulation of the blood is stopped, not only in the Heart, but also in the Veins, when they are stopped with very thick blood, or with blood congealed like the pith of an Elder stick, as I have often seen it after burning Feavers, and as it has been observed by *Fernelius*. The Veins.

The most frequent Diseases of the Heart are Feavers, wherewith it is inflamed, and roasted as it were; so that the Original moisture thereof, becomes exhaust, and dried up: for as *Ludovicus Duretus* saies in his Commentary upon *Hippocrates* his Coick Discourses: *We lose more of our strength by a feaver of seven daies continuance, than by the depredation of our Natural Heat, in seventy yeers time: a yong man dies in seven daies, consumed by a Feaver, who might have lived seventy yeers under the sole regiment of his Natural Heat.* A Feaver:

The History of Feavers belongs to this place, which I shal dispatch in few words. The Hot Distemper of the Heart, is termed a Feaver. The Differences of Feavers are taken from their conjunct Cause, which is three-fold; The *Spirits*, the *Humors in the Vessels*, and the *Humors fixed in the solid parts of the body*. Differences of Feavers. In respect of the Cause, a Feaver is,

From the *Spirits*, a Feaver is termed *Spirituosa*, or *Spiritual*; from the *Humors in the Vessels*, it is termed *Humoralis*; and from the *Humors fixed in the solid parts*, it is termed *Hectica*. Spiritual,

Though there be three sorts of *Spirits*, Natural, Vital, Animal; yet is it the Vital Spirit alone, which being inflamed, causes the Spiritual Feaver. There are four *Humors* contained in the Vessels, whence comes four sorts of Humoral Feavers; the Sanguine, the Cholerick, the Flegmatick, and the Melanchollick. But the Hectick Feaver is distinguished by three degree: For the simple Hectick arises from the fixed Humor, being only inflamed; the middle Hectick is when the said Humor begins to waste; and the *Hectica Marasmodies*, when it is quite exhaust, and consumed. Humoral

The *Modi* of Feavers, or their manner of afflicting, is two-fold: for either the Feaver is continual, or it intermits; it is putrid, or not putrid; malignant, or well-affected. A continual Feaver never ceases burning, til it go wholly away. An intermitting Feaver, leaves the Patient some space of time free from burning. In respect of the manner, Continual, Intermittent:

The Cause of the Continualness of a Feaver, is the plenty of Morbifick matter and its nearness to the Heart, and the distance and paucity of the said matter is the Cause of its Intermision. A Putrid Feaver is caused by Putrefaction of the *Humors*: An Impurrid Feaver is caused only by the fervency of the *Spirits* and *Humors* contained in the Vessels, or fixed in the solid Parts. A Malignant Feaver is caused by extream Putrefaction, or by divers Symptoms greivously afflicting the noble Parts: a Well-affected Feaver, has none of al these. A great Feaver is the same with a Malignant, and a little Feaver differs not from a Well-affected. Hence are al the differences of Feavers taken; a spiritual Feaver is continual indeed, yet lasts but a Day, and is therefore termed *Ephemera*: a Sanguin Feaver is also continual and threefold, Encreasing, standing at a stay, and decreasing; Putrid or Impurrid: It is by some termed continens to distinguish it from the rest of the Humoral Feavers. Cholerick, Melanchollick and Flegmatick Feavers, are continual, Putrid, Impurrid, Malignant, Non-malignant.

tinual, when the Humors from whence they arise do Putrifie in the great Veins: when they Putrifie in the little Veins, or out of the Veins, they make Intermittent Feavers. An Heftick Feaver is also continual, but slow and lingering.

The fit of a Feaver. The Return of intermitting Feavers is termed their fit; the more than ordinary violence of continual Feavers it called their *Exacerbation*. The beginning of a fit is called *Invasio*, the time of Remission and Exacerbation, of intermission and accession, is termed *Periodus* or *Circuitus*, the Period or Circuit.

Its Exacerbation. Now the Accessions or exacerbations of Feavers are various according to the various motion of the Humor. They come every third day, by reason of the proper motion of Choler, whence all bilious intermitting Feavers are called *Tertian* or third day Agues; as the *Quartans* come every fourth day, because the Melancholick Humor is moved upon that day; as Flegm is moved every day, whence *Quotidian* Agues are Flegmatick.

Circuit *Tertian Feaver.* *Quartans* *Quotidian* *Quintan*, *Septan*, *Nonan*, or fift, seventh and ninth day Agues, as they are exceeding rare, so are they not comprehended under any Rules of Art.

The Proper Symptomes of the beginnings of Ague-fits, do shew the sort of Ague what it is: so a shaking shewes a Tertian Ague, A grinding cold fit that makes a man think it would break his bones, argues a Quartan; and for the fit to begin with a mere simple coldness, is the token of a Quotidian.

A double tertian comes every day, as the Quotidian does, but with extream shaking; whereas the Quotidian comes only with a coldness.

Confused. Confused and implicated Feavers, are made of those Feavers, which we have now explained. Confused or mixed Feavers, are made by mixture of the Humors, as a Bastard Tertian is made by a mixture of Choler and Flegm. But Implicated Feavers are stirred up by Vicissitude of Humors put into Putrefaction or Commotion, where upon there is observed in them, distinct fits one following another, as in a double Tertian, and in a double and triple Quartan, and in a Semitertian, which is nothing else but a complication of a continual Quotidian and an Intermittent Tertian: and in the Feaver called *Triteophyæa*, which lasts thitty hours and longer.

Implicated Two Agues are observed to follow one another, so that the first being not quite finished; another which is worse succeeds and follows the same. But if these fits are inordinat keeeping no certain Course, and returning upon several daies, they make such Agues as are termed *Erraticæ*, wandring giddy Agues.

Erratick There are other differences of Feavers taken from the Symptomes, yet so as they may be reduced to these sorts I have spoken of: as the Feaver *Epiala*, *Leipyria*, *Typhodis*, *Eleodis*, *Pestilens*, *Causus*, for they are all Humoral, and distinguished by some remarkable Symptomes.

In respect of Symptomes. In the Feaver *Epiala* there is a sence of heat and cold by reason of the unequal motion of the Morbifick matter. In *Leipyria*, the outward Parts are cold, and the inner Parts burn with Heat, because the Feaverish Heat is drawn inwards.

Epiala *Leipyria* *Typhodes.* *Typhodis* and *Eleodis* are, in which the Patient sweats much, without any ease theteby. A *Pestilential Feaver* is no other than a putrid, but it Springs from an extream and remarkable putrefaction, and so deadly, that more die than recover.

Burning Feaver. *Causus* is a name signifying extream Heat and burning, such as is in a continual Feaver arising from Choler, so that a Cholerick continual Feaver by way of Eminency is so termed.

Symptomati- cal Feavers. *Cremnodes Febris* the Feaver so called, is said to proceed from an Inflammation of the Lungs: but such Feavers as are caused by Inflammation of the Internal Parts, are Symptomati- cal, neither are they properly termed Feavers. For here we speak of a Feaver only as it is an hot distemper of the Heart primarily affected.

Chap. 9. Of the Vessels viz. Veins, Arteries and Nerves
contained within the Chest.

I Have a few things to speak of one Part of the Trunk of *Vena Cava*, for ^{In the chest} the whol Trunk has been sufficiently explained in our Chapter of the lower ^{are Veins.} Belly.

You shal observe that the Trunk piercing through the Midrif, does receive that same ^a Hepatic branch which arises from the top of the Liver, and carries Blood ^{Hepatic a} into the *Cava*, and from that same Oblique insertion, unto the opening of the Trunk, in the right Ventricle of the heart, there is the distance of two Fingers breadth.

^a T. 12. f. 1. r. r. &c.

From whence we may gather, that Blood is carried directly from the Liver to the Heart, although it is mixed with other blood ascending by Circulation. That same opening of the *Vena Cava*, and its cleaving to the right Ventricle of the heart, is contained and to be seen within the *Pericardium*: which when the Trunk has passed through, it ascends unto the Claves.

And therefore you may know, that the blood ascending unto the heart by Circulation, does also come as far as the Throat, and is derived into the upper Limbes, with that blood which descends from the Head by the Veins.

You shal observe, that this Trunk does afford no branches to the heart except the ^a *Coronaria*: but only to other parts of the Chest, and how blood shed out of the left Ventricle of the heart into the Lungs, may be revelled by Blood-letting, seeing it has two Doors to be broken open in the heart, before it can come to the Trunk of *Vena Cava*, which hinder the flowing back of the Blood from the Lungs. ^{Coronaria}

You shal consider if the ^b *Anastomosis of the Arteria Venosa with Vena Cava* be remaining, by which the foresaid Reflux may be made: or whether the blood of the Lungs, ought not to return into the left Ventricle of the heart, that it may be made vital, and then speedily to be cast into the *Aorta*, from thence to be forthwith delivered over into the Veins.

Then you are to search for the *Vena* ^c *Azygos* or Vein without a fellow, which nourishes the Ribs. In it you shal observe two or *four valves or shutters*, not feigned and imaginary, but true, interchangably disposed, which resist the blood flowing in abundantly. I have many times shewed those valves, and an inferior branch of this Vein, ending into the Trunk of the *Vena Cava*, below the Kidneys. For which caule it cannot drink up nor transmit purulent matter into the Kidneys. ^{Azygos}
^{Its Valves}

This branch serves to disburthen the *Vena Cava* above the Heart, if blood do any time there abound, or be contained in any great quantity, within the little branches or twigs of the *Azygos*, or solitary Vein.

Furthermore you shal search out the mutual *Anastomoses* of the twigs of the *Azygos* or solitary Vein, with the twigs of the Chest Vein, under the lesser saw-fashioned Muscle, near the Arm-Pits. Hence it comes that in the Pleurisie, the pained side is better disburthened and the pain sooner eased, by opening the *Vena Basilica*, than any other Vein. ^{Anastomoses.}

^a T. 12. f. 2. ^b T. 11. f. 3. and 6. B. ^c f. 1. D. t. 12. f. 1. a a a. ^d

After the *Azygos* or solitary Vein, out of the Trunk of the *Cava* ascending, the *Intercostals* arise, on ^a each side one, if the branches of *Vena Azygos*, do not reach unto the upper Ribs.

When the Trunk is come as far as the Claves it produces the *Mammaria* or *Dug-Vein*, which is twofold; ^b internal and external: they are both carried through the ^{Mammaria}

the Longitude of the breast-bone unto the Dugs. But the internal being the greater, having transmitted a branch through an hole in the Breast-bone, into the Dugs, Runs along unto the Right or streight Muscle, that it may Joyn it self to the *Epigastica*. Hippocrates was wont to open the external, in Inflammation and pains of Parts belonging to the Chest: But now because of the Obscurity of those Veins, that operation is not of use: instead whereof Horse-leeches may be applied, or Cupping-Glasses with Scarrification.

^a T. 12. f. 2. b b. ^b T. 12. f. 1. c c. ^c

Thymus a Kernel so called.

In the parting of the *Vena Cava* you shal under it observe a great Kernel, placed in the Throat under the Claves like a Pillow, that it may gently bear up and enfold the Subclavian branches. It is called *Thymus*. In yong Animals it is soft, as in Calves, and together with the great Kernel of the Pancreas or Sweet-bread, it is eaten as a dainty Dish.

Mediastina

By the swelling of this Kernel, Strangulations or a fence of Choaking may happen even to Men, but in Women subject to the Mother it is more frequently swelled, and Choaks them if they be not releived by Blood-letting. Some do reckon up three smal Veins which are termed *Thymica*, *Capsularis* and ^a *Mediastina*: whereas notwithstanding the *Capsularis* and *Mediastina*, are one and the same Vein.

Cervicalis.

From the ^b *Ramus Subclavius*, four notable branches do arise. The first is called *Anterior* ^c *Cervicalis* the foremost Neck-Vein, which being drawn out upon the *Musculi Mastoides*, ascends unto the Chin and Waters the fore Parts of the Neck.

Internal Jugular.

After this follows the ^d *Internal Jugular*, being larger than the external, which ascends unto the Neck under the *Musculus Mastoides*, and about the middle thereof, it is divided into three Branches, one of which being greatest and thickest, creeping along the *Vertebra's* goes under the Scul, making its entrance at the hole which is near the *Apophysis Styloidea*, so as being applied to the lateral Channels of the *Meninx dura* or *Dura Mater*, is pures out its Blood and goes no farther.

The Second branch creeps through the sides of the Neck and is distributed under the Jaw.

The third goes into the Tongue and produces the *Ranula* or Veins under the Tongue, the opening of which does wonderfully help in Diseases of the Brain.

External Jugular.

A Finger-breadth distant from this Vein you have the *Externa* ^e *Jugularis*, which creeping assant or sloaping under the *Clavicula*, it sends forth two twigs, whereof the one passes Obliquely unto the *Delta*-shaped Muscle under the Shoulder-point and is united unto the *Vena Cephalica*; the other arises to the lateral Parts of the Head; where at the corners of the Jaw-bone it is divided into two, and is distributed into the Jaws and al the Parts which are subjected unto the Jaw-bone.

The Other Portion, being carryed behind the Eares, is distributed into the Fore-Head and hinder Part of the Head, and upon the Temples with manifold branches; and in these Parts, by reason of the Veins, *Fernelius* did conceive that a ferous Humor was heaped together, which flowing down upon the Parts beneath, does breed Fluxions in the Habit of the Body: he conceived likewise that an Issue made, or a caustick applied to the Cavity behind the Eare, did more good, than if it had been made in the hinder part of the Head, because of a branch of the Jugular Vein, reaching unto the Eye.

whether and in what Case it may profitably be opened.

This external Jugular Vein being opened by a skilful Surgeon in sleepey Diseases, is very good, as many Histories do testifie: but many wil not allow of it, who prefer two or three Horse-Leeches fastened according to the Longitude of the Vein, as far as the corner of the lower Jaw, where it sticks out and is visible.

Howbeit

Howbeit you must observe, that the internal Jugular does in the Neck communicate with the external; and there this external Vein being opened, although it reach not unto the Brain, yet may it disburthen this Part, seeing the internal Jugular is hid, under the *Musculus mastoideus* and cannot safely be opened. And therefore that same opening of the Jugulars which is so much spoken of, is to be understood of the external Jugular, and not of the internal.

And because the Arteries and Veins are alwaies contiguous and coupled together, in the same Line you shall look for the Trunk of the *Aorta ascendens*. Springing out of the left Ventricle of the Heart, it does presently even in its Rise produce the two *Coronary or Crown Arteries*, which do compass the Heart like a Crown.

These you will not see exactly, unless you cut the *Aorta* and look into it through the left Ventricle of the heart: if there be only one, you shall find a little Valve placed at the Orifice thereof, as in the Coronary Vein.

The Trunk of the *Aorta* after a little progress, is without the *Pericardium* divided into Two Branches, the one whereof is termed *Ascendent*, the other *Descendent*.

^a T. 12. f. 4. C. &c. ^b T. 12. f. 5. ^c T. 12. f. 4. A. ^d T. 12. f. 4. C.

The *ascendent* is triparted, three Arteries being brought from the same place; that on the right side ascending to the Claves, makes the *Subclavia dextra*; the other two ascend unto the left side; the first whereof, is called *Carotis Sinist.* going upwards; the second is named *Subclavia sinistra*; and a while after *Axillaris*, when it is come as far as the Arm-pits, and tends forth the *Arteria Cervicalis*, near the Shoulder-point.

The *Right Subclavian Artery* having over-past the Claves, does produce that Artery which is termed *Carotis Dextra*, which near the corner of the lower Jaw-bone, is like the internal Jugular Vein, divided into two notable Branches, the *Internal*, and *External*. They are termed *Arteriae Carotides*, Sleepy Arteries; because they being compressed, do make a man fall into a deep sleep, and take away his Voice: Which I have often demonstrated in Dogs, and how the same is done by tying a Nerve or the next Conjugation.

Galen. in his Book, of the Utility of Respiration, does conceive, and proves by making experiment in Live Creatures, that Animals are no way offended by tying or straining the Jugular Arteries; and therefore he refers the Sleepy-Evil to the Jugular Veins. I shall rather think, that in Apoplexies and Dead-sleeps the Arteries are stopped, than the Veins.

Valverda does testify that *Columbus* made publick demonstration in a youth, that deep sleep is caused by compression or constriction of the Carotick Arteries; but he does not tell us how he did it.

That the ascent of the Carotick Arteries and their penetration into the brain by the holes of the Skul may be plainly perceived, you shall put in a very small brass Wire that will bend, with a knob at the end, into the several divisions of this Artery; which may be done and shewed, by the vulgar way of dissecting the Brain, beginning from the upper Part, not from the lower Part after the manner of *Varolius*, and in the Neck you shall put your Probe into the Carotick Artery.

^a T. 12. f. 4. B. ^b f. 4. a. ^c f. 4. B. ^d T. 24. f. 2. A. ^e T. 12. f. 4. d. d. ^f f. 4. a. ^g f. 4. c. ^h f. 4. b.

The Trunk of the *Aorta* being writhen towards the left side, and bent downwards again, is born up by the *Vertebrae* of the Back, and in its progress as far as the *Os Sacrum*, out of each side produces as many Arteries as there are *Vertebrae*, neither is here found any solitary Artery to accompany the solitary Vein, but there are such like petty Arteries which supply its place.

Arteries.

Coronaries.

Subclavia

Axillaris.

Carotides.

whether the obstruction of the Carotides do cause deep Sleep?

The Interco-

Lumbal.

Within the Chest they may be termed ^a *Intercostal Arteries*: beneath in the lower belly, ^b the *Lumbal* or *Loyn Arteries*: they insinuate themselves into the spinal Marrow by the holes of the *Vertebra's* which may be proved by a memorable example in *Galen*, in his fourth Book of the Parts affected.

One out of a vehement Inflammation of the Lungs, fell into a Palsie of his upper Limbs, and the upper intercostal Nerves being anointed, he was cured.

Communion
of the Arteries
& spinal Mar-
row.

I, and my most learned fellow Collegiate, Dr. Merlet, have seen a Palsie caused by translation of the matter of a Pleurisie into the Marrow of the back, which Palsie freed the Patient from the eminent danger he was in by reason of the Pleurisie.

So *Hippocrates*, in his *Coicks*, observes, that a Convulsion takes away a Fever, by translation of the Morbifick Matter into the Marrow of the back. The hinder Neck Artery may do as much, which waters the Marrow of the Neck.

I know not how the Humor which causes an Apoplexy, falling through the fourth Ventricle of the Brain upon that Marrow of the back, should bring the Palsie into one side more than another: by that way before mentioned, viz. The Cervical and Intercostal Arteries, the serous Humor may be derived into either side.

By the same Reason, the serous matter may through the Celiac Artery return back into the Aorta, and by the little Arteries penetrating the Marrow of the back, be derived into the Nerves of the inferior Limbs; and on the other side, the matter of a true or bastard *Sciatica*, by the continuation of the thickest Nerve, may return into the Marrow of the back, from whence it may be revelled by the Aorta into the Mesentery.

Nerves.

In the Chest we are to take notice of eight remarkable Nerves or Sinnews. Two of which are called *Diaphragmatici*, two are termed *Recurrentes*, two *Stomachici*, and two *Costales*.

Diaphragmatici

Diaphragmatici, the Midriff Nerves, taking their rise between the ^a fourth and fifth *Vertebra's* of the Neck, from that same thick Nerve of the Neck which goes into the Arm; they descend between the foldings of the *Mediastinum* unto the Nervous Centre of the *Diaphragme*, or Midriff.

Recurrent.

The *Recurrent* ^b and *Stomachic*, are branches of a Nerve of the sixth Conjugation or pair, whose Trunk you shall seek for in the Neck near the internal Jugular, by the *Apophysis Mastoides*; where it is cleft into two branches, the one of which is dislemmiated into the Superior Muscles of the Neck; the other being placed between the internal Jugular and the *Carotis* descends unto the Claves, where it is parted into two branches, the *Recurrent* and the *Stomachic*.

Their bending
Back where to
be found.

The bending back of the left *Recurrent* Nerve is found about the place where the Aorta is bowed in, and that easily, before the *Pericardium* is opened.

You shall find the bending back of the right Nerve, about the right subclavian Artery.

I have often seen Dogs live and run, after their *Recurrent* Nerves were cut, and have my self made publick demonstration thereof, but they could not bawl at all; and when these Nerves are tied they deprive the Animal of voice, and being united the voice returns: wherefore it is apparent, that these Nerves serve to make the voice, because they return upwards, that they may be inserted into the Heads of the Muscles of the *Larynx*, Tongue, and *Os Hyoides*, which arise from the Inferior Parts.

Stomachic.

You shall search for the *Stomachic* ^c Nerves beneath the Heart, near the *Vertebra's*, they lie hid within the folding of the *Mediastinum*, and from them you shall perceive ten or twelve twigs drawn into the ^a Lungs; and of the small branches of the two *Stomachic* Nerves folded and fettered together, is made that same *Nervorum Mirabilis Plexus*, wonderful contexture of Nerves in the upper Orifice of the Stomach.

^a T. 10. f. 7. AB. ^b T. 3. f. 1. 33. ^c T. 3. f. 3. III. 6. 16.

Afterwards the Stomachick Nerves creeping along the hinder Parts of the Stomach, are near the Back-bone between the two Kidneys Joyned to the ^c Costals, so as to make that ^d Contexture of Nerves, out of which all those Nerves are derived, which are distributed into the Parts of the lower Belly.

All ^e Anatomists derive the Costal Nerve from the sixth pair, when as in the mean while, it arises from the same point of the Brain from which the sixth pair arises.

costal

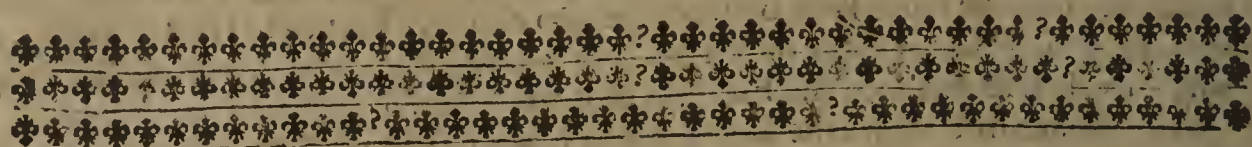
The costal Nerve, being come without the Skull, is strengthened as it were with a Knot tied about it, and it descends undivided upon the Neck; and when it is come to the three last Vertebra's of the Neck, it is defended by another Knot, and grows thicker by addition of three small Nerves; and being slipped down within the Chest, in its progress near the Back-bone, under the Membrane *Pleura*, it is augmented by additions of other two small Nerves proceeding from the Marrow of the Back.

Having pierced the Midriff, it is Joyned to the Stomachick Nerves, to make that same Contexture of Nerves, resembling a Net which is between the two Kidneys.

^a T. 3. f. 8. *bb.* ^b T. 3. f. 2. *H.* ^c T. 3. f. 8. *BB.* ^d T. 3. f. 8. *Δ.* ^e T. 3. f. 8. *BBB.*

The End of the Third Book:

THE



THE
FOURTH BOOK
OF THE
ANATOMY
AND
PATHOLOGY
OF
John Riolanus,
THE
KINGS PROFESSOR
OF
PHYSICK.

Chap. 1. Of the Head.

Why the Head
is placed in the
highest place?

THE Head being the Seat of the Soul, the Mansion-House of the Brain, is placed aloft in the highest part of the Body, as it were the prime Castle, which commands, and bears Rule over the whol City. Galen saies the Head was thus placed on the top of the Body, because of the Eyes, which are the Scouts and Guides of the body: Aristotle saies it was for to cool the Heart, by that coldness which the Brain would shed down thereupon.

Its Size,

An Head that is wel framed, ought to be of an indifferent Size; for a great, and a litle Head, are disallowed, and dispraised.

Shape,

The Natural Figure of the Head is round, or spherical, somewhat longish, bunching out before and behind, with two Eminences, and a little flat, or compressed towards the Temples.

Division.

The Head is divided into the hairy Part, and the smooth Part, so long as it is whol, and unparted: The smooth part is termed the Face, and thereunto is the Forehead

Forehead appertaining. The hairy part retains the Name of the *Head*.

The Head is otherwise considered in the History of the Bones: for it is divided into the ^aSkul, and the two Jaws, the ^bupper, and the ^clower; and the Forehead appertains unto the Scull.

Again, The whol Head is divided into two direct parts, and two side parts. The direct are the ^dfore part of the Head, which from the beginning of the Hair, arises four or five fingers breadth towards the top or Crown of the Head. The External parts of the Head.

After which, the space of two fingers, and as much after the Vertical point of the Crown, where the Hairs turn, is termed ^eVertex: the hinder part is called ^fOcciput; the lateral parts are called *Tempora*, & the Temples, or Times; because they discover the Times of a mans Age by their hollownefs, hoariness, or baldness.

The Head is compounded, and made up of many parts, of which, some are external, others internal; or containing, and contained. The constituting parts.

The Containing, or Membranous, or Bony; the contained, or internal, are the Brain, the *Cerebellum*, or petty brain, the four roots of the Spinal Marrow, and such Particles as are included in their Cavities.

The first containing part we meet with, is the ^hhairy Skin, which has also its ⁱEpidermis, or Scarf-skin. Under the Skin, lies the ^jFleshy Membrane, which is the Foundation, & Seed-plot of the Hairs: which if it be Fleshy, it makes the hairy Skin movable, because it sticks close hereunto without any fat coming between. The hairy Skin. The fleshy Membrane.

The *Pericranium* follows, which does immediately compass the bony Skul. It is produced from the thick *Meninx*, which in Children, goes through the Sutures, at what time they are not firmly closed, nor joyned Tooth within Tooth. Pericranium

^aT. 15. f. 3. A B C. ^bf. 5, and 6. ^cf. 3. L M N. ^df. 3. A. ^ef. 3. B C. ^ff. 4. C. f. 6. A A. ^gf. 3. D. f. 6. B. ^hf. 1. A A. ⁱf. 1. B B. ^kf. 1. C C.

Besides the *Pericranium*, there is scraped from the Skul, as from other bones, the *Periostium* being a thin Skin, which immediately covers them. Wherefore the *Pericranium* is not the Periosteum of the Skul, but is spread out upon the Skul by a great Providence of Nature, that it might hold fast the Muscles which arise from the Skul, such as are the temporal Muscle, the strongest in the whol Body, which with its companion, contracts, and lifts up the Jaw, and bears greater burdens in some bodies, than the other Muscles acting al together. Periostium

Allo it strengthens, and closely comprehends the Muscles of the hinder part of the Head. Descending to the Eyes, and stretched out under the Eye-lids, it makes the Conjunctive Coat of the Eye. Its use,

These Membranes being separated, and plucked off, and the ^aSkul having its Cap taken off, it presents it self to our sight, being framed together of many bones, which are joyned one to another, by looser, or faster Sutures, or Seams. The Skull,

Sometimes there are no Sutures, or Seams to be seen, when the Skul is one continued bone. But the History of the Skul appertains to that double *Osteology*, or Bone-story; the one of which has been premised unto this Work, and the other shal be demonstrated at the end hereof.

^aT. 15. f. 1. D D.

The Medicinal Consideration.

The Head being the Fountain, and Original of almost al Diseases, according to *Hippocrates*, by reason of Fluxes of Rheum, which flow from the Head into the inferior parts, even as low as the Feet, does condole, and has a fellow feeling with all parts. Being placed on the top of the Trunk of the Body, like a Cupping-glass, it attracts, and receives vapors which mount from the inferior parts, according to *Hippocrates* in his fourth Book of Diseases: which vapors, the brain being spongy like a kernel, does drink, and sup in, according to the said *Hippocrates*, in his *Book of Glandules, or Kernels*. The Vapors being congealed into Water, do fal down, and

and return up again like a River that ebbs and flows, according to *Aristotle*; which *Hippocrates* had taught before him, having in that respect, termed the Brain, the *Metropolis of a cold, and moist, glutinous, and clammy Humor*.

Shape depraved.

If the *Shape of the Head* be depraved, so that it be sharp pointed, or the longitude thereof, be turned into latitude; such an Head cannot be sound and healthy: and therefore either it is diseased, or the principal Faculties are weakened. In Children new born, such a Figure be observed, it may be corrected by Art, and with the Hand; as if it be great, and large, when the Child is a month or two old, drying Medicines being applied, and Fontanels, or Issues made in the Nape of the Neck, the over-great moisture of the Brain may be dried up; and consequently the Head wil become less; which cannot be effected when the Children are grown up. A narrow Head, cannot be by Art enlarged, in any Age whatsoever.

Over lax, or loose, &c.

If the Sutures of the Skull are *straiter* than ordinary, or if there be no Sutures, or they be *wider than is fit*, the Head is subject to Diseases, because the Inoaky Excrements of the Brain, have not a free passage.

If the Head be more *loose and open* than is fit, it is the more exposed to the Injuries of the ambient Air.

These Inconveniencies may be remedied by help of Physick, or by wearing a Cap, or by going bare-head, as occasion requires.

Particular diseases.

I proceed unto the Particular Diseases of the Parts containing. And first of the hairy Skin, whose Action is the breeding of Hairs, the efficient cause whereof is a temper moderately hot and dry, and an indifferent Constitution of the Skin; and the internal cause is a sooty Excrement, which thrusting it self forcibly by the small Pores, gains the form of a thred. The hurting of this Action, is a Symptome of the hairy Skin. The hurt thereof is three-fold, it is diminished in the Disease termed

Ophiasis.

Ophiasis, in which the Hairs fall off from the hinder part of the Head, along to the Fore-head, making bald wreaths like those of Serpents; or it is abolished in baldness, and the *Alopecia*, or Fox-fall of the hairs.

The Cause of the falling off of the Hair of the Head, is the hot and dry distemper of the Skin, with a naughty and sharp Humor, eating away the roots of the Hairs.

The Naughtiness of the Humor is known by the color of the Skin, and of the blood, which comes out of the Skin being pricked.

Baldness

Baldness is a deprivation of the Hair of the Head, by reason of an Hectical dry distemper, and hard Constitution of the Skin. A defect of Nutriment, and profitable Humor, or of the fuliginous Excrement, causes this distemper of the Skin. Hence it is that Eunuchs, because very moist, do never wax bald.

Gray Hairs

Gray-hairedness is a Symptome of the Hairy Scalp or Skin of the Head, by which the Generation of Hairs is depraved, so that they grow white before the time. The cause of both these kinds of baldness, as wel that which comes Symptomatically, as that caused by Age, is the cold and moist distemper of the Skin, whereby the fuliginous Excrement of the Skin is allaid and tempered. When I say a cold distemper, I mean the weakness of the Natural Heat: whence it comes to pass that by sickness and sorrow, many become gray-hair'd, because the Natural Heat is by both diminished.

Dandruf

Ulcers of the Head are either light, and possess the Scarf-skin only, which turns into little Scales, Scurf, or Dandruf, when the Head is combed: whence the Greeks term it *Pinuriasis*, the Latins *Porriago*: such like Ulcers are either dry and invilible; or they are visible, and manifestly to be seen: their Cause is an hot and dry distemper of the Skin, with a sharp and thin Humor.

Sore Head

Achor, is a Disease of the Skin of the Head, compounded of a tumor, and an Ulcer; the tumor is known by the inequality, the Ulcer by little holes, out of which flows a clammy Humor; which made *Pliny* call the flowing Ulcers of the Head, *Cetron*, or the *Honey-comb*. But the Honey-comb, though a tumor, and Ulcer of the Head, yet differs from the former, because it has greater holes, and the Humor that comes out is mattery like Honey, or of the Consistency of Honey. *Pliny* calls them Ulcers congealed together like an *Honey-comb*. The Cause of both these Diseases,

Diseases, is an hot and dry distemper of the Skin, with a sharp and biting Humor, which invites one to scratch: by scratching, the swelling is encreased, and at length Ulcerated, so that the holes break out: Vulgarly 'tis called *Tinea*, the Moath, because the holes are like those of Moath-eaten Garments.

Hydrocephalos, or the *Water-head*, is a swelling of the Head, caused by a wheyish Humor, collected and shed abroad between the Skul, and the *Pericranium*; or between the Skul, and *Dura Mater*, or within the Ventricles of the Brain filled with wheyish moisture, which runs over as it were on all sides.

Head-dropsies

In Infants 'tis caused by squeezing of the Childs Head at the time of Birth. In those that are grown up, the cause hereof is a cold and moist distemper of the Head and whol Body, or a translocation of serous humors unto the Head, which generally is swelled, and raised to a vast compass, by the humor under the Skin, or included within the Head.

Pthiriasis, or the *Louzy Evil*, is a Symptome of the hairy *Scalpe*, when instead of the thicker Excrements, or together with them, Lice are bred in the top of the Skin, or deep in the same.

Louzy Evils

The Cause hereof, is an hot and moist distemper of the Skin, with a putrified humor not very sharp; which makes this Disease commonly subject to Children, and old Flegmatick Persons.

The Temple-Muscles are to be observed, which cover a great part of the Skul, whose wounds or bruises, do cause a Convulsion, and contract, and straiten the Jaw.

Chap. 2. Of the Brain.

THE Skul being duly sawed in sunder, and the covering removed, the Brain appears, proportionated to the Skul which contained it; such as is the thing containing, such is the contained. Or suppose the Brain gives Figure to the bones when they are soft, then the Skul follows the quantity of the brain, be it great or little. But in case the brain follow not the Natural figure and magnitude of the Head, its conformation is faulty; and consequently sickly and adverse to the internal Sences, both principal, and subservient, which it hurts in their Actions.

The Brains.

The Brain is compounded of a Substance soft, waxy, or pliable, whitish: which because, like a Kernel, it drinks and sucks up humidities, it is therefore by Hippocrates, termed the great Kernel.

Substance.

It is divided into two parts. That which is three times as big as the other, retains the common name of the Brain: the lesser part placed in the hinder part of the Head, is termed *Cerebellum*, or the Petty-brain. Both these parts are covered with common Coverings, termed *Meninges*. The first Coat, or Covering, is called *Crassa Meninx*; the second *Tenuis Meninx*. The Arabians termed these Membranes, *Matres*, or *Mothers*, because they were perswaded, that the other Membranes of the Body, were propagated from these.

Division.

Two Coats,

viz

1 Crassa-meninx.

2 The Tenuis meninx.

The first *Meninx* is hard and thick, being united to the Sutures of the Head, suspends the whol bulk of the brain; these Connexions must be viewed when the Skul is taken off. In the thick *Meninx* are observed innumerable Vessels; where-with it is sprinkled and strewed: they are rather Arterial than Venal, being produced from the *Rete Mirabile*, being drawn out from beneath upwards, as far as the Channels of the *Meninx*, where they unload their blood; and therefore it is the Membrane which is seen to beat and pant, rather than the substance of the Brain.

^a T. 16. f. 1. ^b f. 3. A A. ^c f. 6. A A. ^d f. 6. D D. ^e f. 1. A C. f. 2. B. f. 3. H. & c. ^f f. 1. B B. ^g f. 1. A A. & c. ^h f. 1. a a.

Now the Pipes belonging to this Coat, are four; whereof two are lateral, which run along the sides of the *Sutura Lambdoides*, that they may receive the blood

The Pipes.

from

from the internal Jugulars, and from the Neck Veins; or by them, according to the Doctrine of Circulation, the blood may flow back unto the Heart.

From the Union of these two Channels, is formed a third, longwise, drawn out directly as far as the Nostrils. In the Concourse of the three beneath, there springs a fourth Channel or Pipe, which goes into the Substance of the Brain, between the Brain, and the Petty-Brain: it is not shut up in the foldings of the *Dura Mater*, but there is a great Vein, so called by *Galen*, which descending into the former Ventricles, makes the *Plexus Choroides*, which is dispersed through all the Ventricles, unto the Basis of the Brain.

Torcular

The Channel which runs longwise, deserves rather the name of *Torcular*, than the fourth: because from thence, is the blood distributed into the lower parts, by innumerable little Veins, through the turnings and windings of the Brain.

These lateral Channels, neither do the Veins, nor the Arteries go into, and pass through with their Coats, but are terminated at the entrance; and therefore those Channels are rather Arterial, than Venal: for the Brain being of its own Nature cold and soft, ought rather to be nourished with hot, subtle, and Arterial blood, than with such as the Veins afford, being thick, and hard to penetrate.

And in case the Vein, and Arterial blood were confused and mixed together in these Channels, they would not pant or beat; and the Pulsation of the Channels demonstrates, that it depends not upon the Body of the Arteries; for there are none in that place, but upon the leaping of the blood, after the manner of Arteries.

^a T. 16 f. 5. a. & b. ^b f. 2. a a. f. 5. c c. ^c f. 5. e e. ^d f. 3. D E ^e T. 17. f. 1. O O R R. T. 16. f. 3. F F. f. 5. f f. ^f T. 17. f. 5. F. ^g

Now this Menbrane, namely, the *Crassa Meninx*, divides the Brain into two parts, as far as the middle thereof, by the *Corpus Callosum*. This Partition is termed *Falx*, and being doubled on both sides, it severs the Brain from the Petty-Brain.

Falx

Tenuis Meninx

why the Brain is full of windings and turnings?

The *Tenuis Meninx* follows, which immediately incloses the brain, being closely conveyed into the windings and turnings thereof; for the substance of the brain, is without, after a wonderful manner, full of deep turnings and windings; for the lighter passage of the Arteries, which disperse the blood here and there; and therefore *Pelops*, the *Master of Galen*, seeing those little Arteries dispersed up and down the Brain, did believe that there was the beginning of the Veins.

The *Tenuis Meninx* is three times so long as the *Crassa Meninx*, because it passes into the inner Parts of the Brain, and as a Veil it covers and separates, and divides the whole Bulk of the Brain into three Parts. For near upon the upper half of the Brain, which covers the Ventricles being placed upon the *Corpus Callosum*, it is on both sides circularly separated and lifted up as high as the Roots of the Marrow of the Back, which do knit together that same upper portion. So that the Brain is divided into three Parts; on each side one over the Ventricles, and the third which includes the Ventricles, being continued, and no waies disjointed.

The two former Ventricles.

A small quantity of the *Corpus Callosum* being cut off, the two former and upper Ventricles appear, which in their lower Part towards the Basis of the Brain are larger, from whence they take their rise upward, being smaller at the top.

They are separated by a Thin Membranous Partition, which is framed of the *Tenuis Meninx* doubled together, and is called *Speculum Lucidum*, or the Bright Mirror, because it is transparent.

^a T. 16. f. 3. A A. f. 5. E E. ^b f. 1. B B. ^c f. 1. b b. ^d f. 2. B B. f. 3. B B. ^e f. 3. D D. E E. f. 4. C C. D D. ^f ^a T. 16. f. 3. G. ^g

The former Ventricles are perforated in the forepart towards *Os Ethmoides*, that the *serosities* may flow down from the superior Parts to that place.

Above the foremost Ventricles there is spread out a ^b Tripartite body, which is termed *Corpus Psalloides*, or the Welch Harp, sustained by three Pillars: whereof two are ^c Lateral: turned back about those ^d Eminencies which *Galen* calls the *Chambers of the Optick Nerves*:

Fornix.

The other forward ^e Colonne, is placed between the two Ventricles. If you shal follow those two lateral *Columnes*, you wil find them to be productions of the Optick Nerves, which within the Ventricles do Joyn themselves one to another, as in the Basis of the Brain; behind the *Choana*, they are again united; whence I conjecture that the power of understanding and knowledg, is principally contained, in the former Part of the Brain, and that from thence the Animal spirit is drawn, which is administred unto the Eyes.

By the Concourse of the two Ventricles *Between the two large Hillocks* aforesaid, and other sublequent Eminencies, is formed a Guttur or Channel, which makes the *third* ^f Ventricle. In the Basis of which Channel there is teen an ^g hole, which penetrates into the *Choana*, to purge out Wheyish Flegm into the throat, near the Palate.

The third Ventricle.

In the sides of this Channel, the *Circumjacent Eminencies* do form, some the ^h *Nates* or *Buttocks*, others the *Testes* or *Stones*. For so those *Eminencies* or *bunchings out* are termed, being interchangably disposed, and from that Channel, the *Hole* which goes into the fourth Ventricle, is termed *Anus* or the ^a *Arse-hole*.

Nates:
Testes:
Anus.

^b T. 16. f. 3. b b. f. 4. B. ^c T. 17. f. 1. G G. ^d T. 16. f. 4. b b. c c. &c. ^e T. 17. f. 1. F. ^f T. 16. f. 4. E. ^g T. 17. f. 1. below Q. ^h T. 16. f. 4. b b. ⁱ T. 16. f. 4. c c. T. 17. f. 1. M M. ^a T. 17. f. 1. above Q. f. 2. F.

In the upper Part of this Channel is superincumbent that same Kernel which is termed ^b *Conarium* the *Pine-Apple Kernel*, because tis shaped like a Pine-Apple. And over this Channel and the fourth ^c Ventricle, is a thin Membrane stretched out, derived from the *Tenuis Meninx*, upon which runs the ^d *Plexus Choroides*, defused through the foremost Ventricles.

Conarium.

In the entrance of the fourth Ventricle, there is placed a certain portion of the Brain more firm than ordinary which represents the taile of a River-Crab when the shcl is peeled off. It is called *Stolicoides* and *Vermiformis* ^e *Processus*, the *Worm-fashioned Production*: is opens and shuts the passage into the fourth Ventricle. This is placed in the *Cerebellum* or Petty Brain; which contained within it self the two hinder most portions of the spinal Marrow, as the Brain contained the other two foremost, which I have named with *Galen* the *beds of the Optick Nerves*.

Processus Vermiformis.

In that same ^f fourth Ventricle, there appeares a certain ^g Chink like a Writing-Pen, which is the Separation of the Marrow of the Back.

The fourth Ventricle.

The Petty-Brain being pulled asunder, you shal see how it conteins within it the fourth Ventricle, between the two aftermost Roots of the Marrow of the back; and how being drier than the Brain, it gives Original to ^h seven or eight pair of Nerves, saving the Optick Nerve.

It is not ful of windings above but beneath, according to the external form of the brain it self. In like manner it is divided beneath into ⁱ two Parts, being continued above.

^b T. 16. f. 4. a. T. 17. f. 1. L. ^c f. 2. N N. ^d T. 16. f. 3. F F. T. 17. f. 1. O O. R R. ^e T. 16. f. 6. E. T. 17. f. 2. C C. ^f f. 1. N N. f. 2. D D. G G. T. 18. f. 4. F. ^g T. 17. f. 2. H. T. 18. f. 4. E. ^h T. 18. f. 3. ⁱ T. 18. f. 4. A A.

Pelvis. If you shal gently draw upwards the formost Part of the brain, as far as its basis,
Glandula Pituitaria. you shal observe the ^k Optick Nerves, and the Nerves, serving for ^a Motion, and
 then the ^b Choana or tunnel dropping Wheyish moisture upon the ^c Glandula
Tubuli. Pituitaria or Flegm-Kernel, which fills up and posselles the Sella Equina or
 Horse-Saddle. In the Choana or Funnel you shal see Four Pipes distilling
Seven pair of Nerves. Wheyish moisture into the Palate and throat. Then you shal consider the order of
 thote seven pair of Nerves recorded in the following Verses.

The ^d First Pair sees, the ^e Second moves the Eyes;
 The ^f Third and Fourth tast, ^h Fift bears and makes us Wise.
 The ⁱ Sixth is large and wanders all about:
 The ^k Seventh Larynx moves a prating Tongue so stout.

Rete Mirabile. Then you shal search under the Dura Meninx in the basis of the brain about the
 Compass of the Sella Sphenoides, for the Rete Mirabile or wonderful ^l Net of Arteries
 interwoven one among another, being formed of the two ^m Carotides or sleep
 Arteries.

You shal observe in the Basis of the brain, that Wheyish Humors or blood
 is powred forth, in extream pains of the Head coming with Inflammation, which
 while they seek to go forth by the Cavities of the Ears, they cause extream sharp
 pains, which bring the Patient into Madnes and Sicknes. Whether or no in such a
 desperate Case, may we boar either side or the Hindermost Part of the Head, to
 let out the superfluous putrid Humor, which corrupts the substance of the
 Brain?

The ⁿ Auditory Nerve is worthy of Consideration, which is inserted into the
 Cavity of the Eare, and by a little Channel slides down into the Palate, and is
 distributed into the inner Part of the Larynx: from whence comes that same Con-
 cent that is between the Tongue and Teeth, the Larynx and the Lungs.

^k T. 17. f. 1. S. T. V. T. 18. f. 1. B. f. 3. BB. ^a T. 18. f. 1. CC. f. 3. GG.
^b T. 18. f. 3. D. ^d T. 18. f. 1. BB. f. 3. BB. ^e f. 1. CC. f. 3. GG. ^f f. 1.
^d DD. f. 3. HH. ^g f. 1. EE. f. 3. II. ^h f. 1. FF. f. 3. KK. ⁱ f. 1. GG.
 f. 3. LL. T. 3 f. 8 all ^k f. 3. MM. ^l f. 3. PP. ^m f. 3. CC. ⁿ T. 18. f. 1.
 FF. f. 3. KK. ^o

Observe Whether or no they be intersected Crose-wise, so as the right should
 from its original be carryed unto the left Part, and the left unto the right, which
 I have never seen.

Whether the Nerves in their Rise have Arteries Joyned in company with them?
 Whether the Nerves are made up of many smal threds? Whether the other Nerves
 differ from the Optick Nerve.

I wil not wholly pass over those four notable Questions: Whether the brain be
 moved? Whether or no the brain does cool the Heart? Whether the Ventricles of
 the brain are ordained only to contain Excrements? Whether, or no the blood be
 there Circulated and how?

whether the
 Brain have any
 Motion?

As to the first Question, I say that the substance of the Brain is not moved of it
 self, by Diastole and Sistle, after the manner of the Arteries, but only the Crassa
 Meninx, which is sprinkled al over with Arteries, arising from the wonderful
 Contexture of Arteries, unto the upper Channels of the said Crassa Meninx: also
 the Channels do pant, and the brain is moved by elevation and depression
 of the substance thereof, according as it is driven by the Animal spirits.

whether it
 cools the heart?

The brain does cool the Heart, in as much as by Circulation, it sends back the
 blood unto the Heart being cooled in the Brain.

The use of the
 fore Ventricles.

The foremost and uppermost Ventricles are Receptacles for spirits: the whey may
 indeed descend into the upper Ventricles, from the whole Mass of the brain, but it
 presently

presently falls down into the lower Ventricks, that from thence it may flow through the *Os Ethmoides* into the Nostrils: if the *Os Ethmoides* or Colander-bone be obstructed, it distils by the *Choana* or Funnel, or by the little holes over the Funnel, into the Palate and Jaws or Throat.

The Circulation of the blood is performed in the brain, with a slow pace. The blood rises out of the Netlike-Contexture, by the Arteries of *Dura Meninx*, unto the four Channels; afterwards it descends by the Veins unto the Heart, having been plundered of its spirits, which the brain drank up. And so the blood being cooled, is said to coole the Heart. Of all which I shall treat more fully in my *Anthropographia*, or large Description of the body of Man.

whether or no and how the blood is circulated in the Brain.

The Brain, being of its own Nature cold and moist, is nourished only with the purer and more spiritous arterial blood, which ascends by the *Carotides* and passes speedily forth. And though the Spirits are tempered, they loose none of their subtilty, because they are not mingled with the Air. From the *Plexus Mirabilis*, blood ascends by the Arteries which spring from the said *Plexus* unto the Crown of the Head, where the blood Channels of the brain are Scituate. From whence it distils into the lower and side Parts of the brain, and also by that same great Vein mentioned by *Galen*, which makes the *Plexus Choroides*, it is distributed into the inferior Parts.

what Blood the Brain is nourished with?

And therefore in bleedings of the Nose, the most pure blood does alwaies come away, whereas that which is taken away by opening the Veins of the Arms or feet, seems alwaies most impure.

what Blood comes away in the Nose bleeding.

Whereby you may know, that it is only the Arterial blood which nourishes the brain and which comes away by the bleeding at Nose: and it was not without Cause that *Fernelius* would have it stopped, after it had bleed a pound, to coole the body and extinguish the Feaver. And therefore refrigerating and astringent Medicaments are to be applied, not only to the hinder Part of the Neck, but also before upon the Carotick or sleepy Arteries.

You shall observe that the Air drawn in by the Nostrils, does not pass under, nor enter into the foremost Ventricks of the brain, because they are void of any Inlets, but being shed externally round about the *Crassa Meninx*, it cools the Surface of the brain. Nor is it mingled with the Spirits, because they ought to be most subtil, otherwise by permission or mingling of the Air, they would become more thick and would not run so swiftly by the Nerves all the body over.

whether the Air goes which is drawn in at the Nostrils? whether it is mingled with the Spirits?

The same I conceive touching the Air received into the Lungs; that it is not mixed with the vital Spirit but only cools the Lungs.

Now that the brain may be demonstrated after that manner, which *Varolius* describes in a particular Book: You shall see in sunder the Scull of a body newly dead, round about near the Eyes, and the hollow of the hinder part of the Head, and with a pair of Pinners you shall take off the upper portion of the Socket of the Eyes, that you may draw out the Eyes hanging at their Optick Nerves.

The Manner of Dissecting the brain and the History of its Parts.

Afterwards having pulled the *Dura Meninx* from the Scull round about with help of a Spatula, leave it at the Basis of the Scull, where it sticks exceeding fast to the Bones. Then you shall take out the Brain and as much of the Spinal Marrow as you can both at once, and let some body hold the Brain turned upside down in both his hands whiles you shall dissect it.

But you shall first search within the *Dura Mater* for those four bendings or Hollowneses, for the place of the *Presß*, the great Vein described by *Galen*, which makes the *Plexus Choroides*, and that division of the brain which resembles a Sickle: Afterwards returning to the Basis of the Brain, you shall observe the *Tenuis Meninx* to be more easily plucked and separated in the lower than in the upper Part: because the Petty-Brain in its Basis or Bottom is not so full of turnings, away, and windings, as on the top. And therefore the thick *Meninx* being first taken we meet with that same *Rete Mirabile*, or Miraculous Net, made of Multitudes of

small

final Arteries, springing from the^h Carotick Arteries, and two otherⁱ ascending through the holes of the Vertebraes of the Neck; but it will be torn, which cannot be prevented. Now each of the Carotick or Sleepy-Arteries enters within the Scul divided into two, to Weave that same wonderful Net, and creeping upwards, through the windings of the brain it is disseminated up and down every way even as far as the Longitudinal Cavity of the *Dura Meninx*.

The *Carotis* is drawn obliquated and as it were crook backt, within that same winding hole at the Basis of the Scul, and within its Cavity, contains certain very *smal Bones*, like thote which are called *Sesamoidea*.

Neither has Nature placed these little bones only in these Arteries, but she has likewise inserted them into other Arteries, where it was requisite, that they should be kept open.

^a T. 16. f. 1. A A. f. 2. D D. &c. T. 17. f. 1. A A. ^b T. 17. f. 2. I I. ^c T. 16. f. 5. a b c e. ^d f. 5. F. ^e f. 5. ff. ^f f. 2. A A. f. 5. E E. ^g T. 18. f. 3. P P P P. ^h f. 3. C C. ⁱ f. 3. O O.

Then you shal observe that the *Processus^a Mammillares* or Teat-like Productions do not run out so far as *Varolius* has described them.

Then you shal see the growing together of the^b Oprick^c Nerves near the *Choana* or Funnel. And therefore Masticatories may do good in the Diseases thereof. Also you shal observe that the Veins of the *Plexus^d Choroides* deicending to the Basis of the^e Brain, are interwoven with exceeding smal Kernels.

In that place the *Plexus Choroides* is more easily discerned, than upon the foremost Ventricles.

Afterward, you shal contemplate four *tuberous Eminencies*: two^f before, situate in the middle of the brain, and the other two^g behind, which constitute the *Cerebellum*, or petty Brain. Those Eminencies, or Risings, do receive four white and hard Roots of the Spinal Marrow, whereof the foremost, longest, and hardest, are drawn along between the greater Eminences of the Brain. The other two short ones, are carried within the petty brain; which a thickened Portion of the Marrow of the said petty-brain, placed athwart, as broad as a mans Thumb, does fasten together like a Swath-band, and is by *Varolius* termed^h *Ponticulus*: or rather it is the pavement of the Channel from the third, into the fourth Ventricle.

And the said Channel lies above those foremost Roots of the Spinal Marrow, and is stretched out according to their longitude. Between the growing together of the Optick Nerves, and the foremost Roots of the Spinal Marrow, there appears a four-square hole, which is taken for theⁱ *Choana*, or Funnel, serving to discharge the Excrements of the Ventricles of the Brain.

^a T. 18. f. 3. a a. ^b T. 17. f. 1. T. ^c f. 1. S S. V V. ^d f. 1. O O R R. ^e f. 1. P P. ^f T. 16. f. 4. c c. ^g f. 4. b b. ^h T. 18. f. 4. by C C C C. ⁱ f. 3. E.

When you have viewed al these things, you shal pass over unto the^a Petty-brain, where you shal separate from the Spinal Marrow the *Processus^b Vermiformis* which lies between the two *Tuberous Eminencies* of the Petty-brain, by taking away the *Membrana Choroides*; that so you may see the^c Chamber of the fourth Ventricle and the Cistern of the Animal Spirits.

Then you shal cut a sunder^d the little Bridg, or the Band of the Roots of the Spinal^e Marrow, that the^f foremost and Superior Ventricles of the brain may appear, which you shal see separated by a partition^g as long as ones Finger, drawn from one End towards the Fore-head, as far as the Petty-brain: it cleaves to the^h Arched Roofe of the Ventricles, but beneath it is loose, and free from al ties, that the passage of the Spirits might be free.

But you shal diligently note, that the Extremities of the said partition are double forked: the hindermost bifurcation is longer than the foremost, and it cleaves unto that same transverse Ligament, which connects the two *Tuberosities* or bunchings out of the brain, and so being spread out like a beam it bears up the Vaulted Arch of

of the Ventricles; the fore most bifurcation cleaves unto a little transverse cord, which resembles the Optick Nerve in thickness and in Color.

The same partition which is termed *Septum i Lucidum*, being pulled back, you shal manifestly discern the Vault of the Ventricles, which is called *Corpus Psaloides* or Harpe fashioned body; also you shal see that the foremost Ventricles make but one continued Cavity.

^a T. 16. f. 6. DD. T. 17. f. 2. AA. T. 18. f. 4. AA. ^b T. 16. f. 6. E. T. 17. f. 2. CC. ^c T. 17. f. 2. DD. &c. T. 18. f. 4. F. ^d T. 18. f. 4. by CCC. ^e T. 18. f. 4. DD. ^f T. 16. f. 3. DD. EE. f. 4. CC. DD. &c. ^g T. 16. f. 3. G. ^h T. 16. f. 3. bb. f. 4. B. T. 17. f. 1. F. GG. ⁱ T. 16. f. 3. G. ^k T. 16. f. 3. bb. f. 4. B. T. 17. f. 1. GG. F. ^l

Mean while you shal observe, that the inferior Ventricles placed at the Basis or bottom of the brain, are larger or at least equal unto the superior, and that the continuity of the superior and inferior Ventricles is one and the same: or rather that there are but two Ventricles which contain the whole brain. For the ^a fourth Ventricle lies concealed in the Petty-brain, and is manifestly seen to be wholly and only there.

Further you shal observe that al the ^b Nerves even the Optick ones, do arise out of those same Roots of the Spinal Marrow: and therefore al the Nerves in the body do arise out of the Spinal Marrow, within or without the brain.

For if those *Prominencies*, which are termed by *Galen* the *beds of the Optick Nerves*, are productions of the Roots of the Spinal Marrow within the brain: we may with good reason aver, that the Optick nerves themselves do spring from the Spinal Marrow.

Finally you shal see that the moving Nerves that give motion to the Eyes, are continued, and make one Cord as it were: and that the Optick Nerves being bowed or turned back near the beds of the Optick Nerves, do ascend unto the foremost Ventricles.

You shal likewise see that the *Testes* or *Stones* are ^c portions of the Roots of the Spinal Marrow, growing out of the brain: and the *Nates* or ^d *buttocks* are portions of those Roots which are derived from the Petty-brain.

And if you shal compare this my description of the Parts which are to be seen in the brain turned upside down, beginning from the basis, with that of *Varolius*, you wil find it larger and different from his. And he that wil take pains to do as much, after he has once or twice seen me demonstrate these things, he wil acknowledg the truth of them with admiration.

^a T. 17. f. 2. DD. T. 18. f. 4. F. ^b T. 18. f. 13. &c. ^c T. 16. f. 4. CC. ^d T. 16. f. 4. bb.

Now that in the brain the Diseases & Symptomes thereof, may be distinguished as much as may be by their proper places, the whol bulk of the brain must be divided into three Parts, viz. The ^e brain properly so called, the Petty-brain and the ^f Marrow of the back.

But I divide the brain, as it is the subject of dissection into three Regions, the uppermost, the Middlemost, and the Lowest. In the uppermost you shal observe the Turnings and Windings of the brain; the ^g Sickle, and the *Corpus Callosum*. The Parts of the Supreme Region.

In the Middlemost which is beneath the ^h Vault, you shal observe the Arched feeling of the said Vault, being the Roof which is placed over the Ventricles; the Partition-Wal, born up by ⁱ three Pillars; three ^j Ventricles with certain ^k Eminencies; which make up a Channel to the fourth Ventricle. Of the Middle Region.

And then you shal observe the *Plexus Choroides*, the ^l *Conarium*, and the ^m Petty-brain, and the ⁿ fourth Ventricle therein concealed.

Of the lowest
Region.

In the lowest Region, you shall mark the *Choana*, or Funnel, the *Glandula*, or *P Kernel*; the *Mammillary*, or Teat-like *Productions*; the seven *Pair* of *Nerves*; the *Rete Mirabile*, or wonderful Net; and the *Roots* of the *Spinal Marrow*.

T. 16. f. 6. DD. &c. T. 17. f. 2. AA. &c. f. 2. ll. T. 18. f. 4. DD. T. 16. f. 1. bb. f. 2. AA. f. 5. EE. f. 2. BB. f. 3. BB. f. 3. bb. f. 4. B. T. 17. f. 1. FG. f. 8 T. 10. f. 3. G. f. 3. DE. f. 4. CD. &c. f. 4. E. f. 4. bb cc &c. f. 5. & 6. ff. T. 17. f. 1. OO. RR. T. 16. f. 4. a. T. 17. f. 1. L. T. 16. f. 6. DD. T. 17. f. 2. AA. &c. f. 2. DD. GG. T. 18. f. 4. F. T. 18. f. 3. E. T. 18. f. 3. D. &c. f. 3. aa. f. 3. BGHI KL M. f. 1. BCDEFG. f. 3. PP PP. f. 4. DD. &c.

And forasmuch as *Casparus Hofmannus*, in his *Book against Montanus*, and in his *Institutions*, calls those Men Fools and Blockheads, who suppose that the *Ventricles of the Brain*, are the *Shops, or Work-Houses* where the *Spirits are made*; and so confidently, and arrogantly avers it to be impossible, that he accounts it a great Crime or Madness to think otherwise: I shall briefly examine his, by him supposed invincible Arguments, because no man has yet had the Courage to contradict them: only I shall in the first place demonstrate the contrary to be true.

The place
where the Ani-
mal Spirits are
made accord-
ing to our
Author.

The Animal Spirit is made of the Vital, which is continually brought in great quantity, by the Carotick Arteries to the Basis of the Brain, where the branches meeting, and being woven together, do make the *Rete Mirabile*, from which innumerable branches are derived into the *Crassa Meninx*; that the blood may ascend on every hand to those blood-channels of the *Dura Mater*, which I conceive does alone palpitate, or pant; and I have seen in *Fractures* of the Skull, that when that Membrane is broken, the brain remains immovable.

Seeing therefore the foremost Ventricles are opened in the Basis of Brain, and equal in their wideness to the upper Cavities of the said Ventricles, and are close unto the *Rete Mirabile*, from it the Ventricles draw their Spirits, or the Spirits exhaling from that Texture, whose Arteries are exceeding tender and thin, they are brought along into the foremost Ventricles; and soon after, by the third Ventricle which serves instead of a Channel or passage, they are forthwith carried by a straight course into the fourth Ventricle, the Cistern, or Conduit Head of Spirits; that from thence they may be distributed into the inferior Nerves, and into the Cavity of the Spinal Marrow.

But the seven Pair of Nerves are propagated from those four Eminencies; of which the two greater do form, and enclose the sides of the foremost Ventricles; the other two make the sides of the fourth Ventricle, whose Roof, and fore, and after parts, are made up by the double *Apophysis Scolicoides*.

Those four Eminencies are Spongy, and receive Spirits, which run directly into the Nerves of the Spinal Marrow by the fourth Ventricle.

And no man can deny that the Nerves of the brain are the off-springs of those four Eminencies: and so this Proposition is to be interpreted. All Nerves of the Body and Brain, do spring from the Spinal Marrow, either within, or without the brain.

I deny not that the Spirits are diffused through the whole substance of the brain, and not wholly contained in the Ventricles: but I aver that the Ventricles are the true Shops, or Work-Houses of the Animal Spirit, which is distributed unto the seven Couple of Nerves, and to the Spinal Marrow.

That this is absurd and impossible, *Hofman* does thus seek to prove: 1. Arg. There is the Spirit made, where the Action is performed.

The Argu-
ments of Hof-
man to the
contrary, an-
swered.

I Answer, many Actions are performed in parts, in which no Spirits are bred: and I deny that in the Body of the Brain, all Actions are performed. Again, there needs no other elaboration than their passage through the brain: for as the blood of the Veins, passing through the Hearts Ventricles, is in a moment made Vital; so the Vital Spirits running through the middle of the Brain, as far as the Ventricle, do become Animal.

For

For if it were needful that the Animal Spirit should be elaborated in the Substance of the Brain, it would lose much of its subtilty; because the brain is cold and moist.

2^d Arg. of Hofman. *If the Spirit be to act, it must needs be under the command of the Soul in the Vessels; for after that it is entered into the Sea of the Ventricles; what is there to compel the same to return into the strait passages of the Nerves?*

I answer: If the Spirit be diffused into the whole substance of the brain, being really soft as Wax, how can it return into the Nerves, seeing there are no Vessels running through the substance of the brain? Those bloody marks wherewith it is sprinkled, are points of blood dropping down from above, out of the Arteries which runs between the winding substance of the brain. The great Providence of Nature, because the blood could not pierce, nor pass through the midst of the Substance of the brain, hath carried the same through the Channels of the *Dura Mater*, as far as the blood-passages, whence it slides into the inferior parts, and by the Press, or that great Vein which Constitutes the *Plexus Choroides*, it flows into the Ventricles.

More probable it were to assign the Seat, and Shop of the Animal Spirits in the *Plexus Choroides*, which is diffused through all the Cavities of the brain, as far as the basis thereof. But shew me (friend Hofman) the way by which the Animal Spirits made of the Vital, may be diffused into the substance of the brain, so as to flow back into the Nerves.

3^d Arg. *The Ventricles are surrounded within, with the Pia Mater, which hinders the ingress and regress of the Spirits.*

I Answer: If the Ventricles have for their Covering, the thin *Meninx*, the passage is thereby the safer into the foremost Ventricles, without any loss at all. I have already demonstrated in an Entrance in the basis of the brain, being the way into the fourth Ventricle; there is no need of a regress for Arterial blood, which ascends upwards by the *Crassa Meninx*, distilling into the brain, does on all sides afford Spirits to the whole brain; neither can the blood penetrate without Spirits.

4. Arg. *Hofmans strongest Argument is this: Seeing the two superior Ventricles, open into the third, and that into the Funnel, and it into the Pallate, who will be Surety, that the Spirits will not make their escape this way?*

I Answer: This danger is easily shunned by the continual flux and pulse, or driving of the Spirits to the Cistern; and that same hole is exceeding small, and so deep, even to the *Os Sphenoides*, that it can equal the length of a mans Finger.

You who beleeve that the blood passes from the Right Ventricle of the Heart, through the Lungs, that it may return into the Left, are you not afraid lest we should lose our vital Spirits, when we blow our breath out in Respiration?

5. Arg. *The Ventricles are not continued with the Nerves, but with the whole Body.*

I Answer: If the Nerves proceed from those same Eminencies, which are Roots of the Spinal Marrow, between the Brain, and the Petty-brain, and they are principal portions of the Brain; do not the Nerves arise from the brain it self? But you your self have often times written, that the Nerves arise within the brain, from the Roots of the Spinal Marrow.

6. Arg. *The Ventricles have now another Office, which cannot stand with that of the Spirits.*

I Answer: That I deny any such Office. For the *Choana*, or Funnel, can purge away any wheyish Excrements which shall be in the Ventricles; but the greatest part, flowing down by the external windings of the brain unto the basis, falls partly into the *Os Ethmoides*, or Colander-bone, partly it descends to the basis of the brain; and if not by the *Choana*, yet by other holes near abouts, it is purged into the Pallate.

But because *Hofmans* *Spirits* fail him in handling this *Question* (can you forbear laughing) for they are his own words, we shal also leave him to enjoy his self-love, with a great flock of bleating Animals (so he saies) which follows his absurd Opinion, provided that he be the *Bel-weather*. Let him no more triumph before the Victory, nor let him be so secure and undaunted, as *not to fear Hercules* himself.

Hofmans *Tenent* disturbs the Practice of Physick.

That same new Tenent of *Hofman*, disturbs the whol Doctrine of Diseases of the Brain: and that I may declare so much, I wil chuse out only two Diseases, which have their Seat in the Ventricles, *viz.* The *Epilepsie*, and *Apoplexy*.

The *Apoplexy* he makes to be in the whol Substance of the brain, not in the Ventricles: The *Epilepsie*, he wil have to be caused only by vapors ascending into the Head, and diffused through the whol substance of the brain. He allows of no *Epilepsie* from a primary affection of the Head, but only by Sympathy from other parts.

He assigns the Seat of the *Apoplexy* to be in the whol substance of the brain obstructed, and avers that it is caused only by blood shed forth of the Veins; and makes the Cause thereof to be the obstruction of the Press introduced by *Nymmanus*. But if the Torcular, or Press is obstructed, which is the fourth Channel carrying blood into the *Plexus Choroides*, the passage of the blood and Spirits is intercepted. But according to *Hofman* in an *Apoplexy*, only blood is found shed out of the veins within the Ventricles, and therefore the Torcular was not obstructed.

It is a certain, and undoubted thing, confirmed by many Experiments, that in the *Apoplexy*, the Ventricles of the brain are obstructed, or there is an obstruction in the *Choana*, or Funnel. But especially the hole of the fourth ventricle which is shut with the *Apophysis Scolicoides*, is stopped by thick and clammy Flegm sticking there; which if it be not dissolved, or removed, being evacuated through the Funnel, it causes death.

If the Matter be serous, and pass into the Spinal Marrow, it causes the Palsie instead of the *Apoplexy*; and so a greater Disease is cured by a lesser, the matter being translated from one place to another. But if blood happen to be shed into the ventricles, present death follows.

But if to be the *Apoplexy* should be produced by blood alone, as *Hofman* will have it; how could blood which was shed into the ventricles, pass into the Nerves without putrefaction, and how could it enter into the Cavities of the Nerves?

In these two Diseases he hath betrayed his own Ignorance, although he could find no such difficulty in the falling sickness, as *Crato* acknowledged, whose Wish was this: *Would to God I could see before I die, the Essence of this Disease, together with the Cure thereof rightly explained.*

The Medicinal Consideration.

Principal diseases of the Brain.
Distemper.

The brain is exercised with many kinds of Diseases, with an hot, cold, moist Distemper; with divers Humors, Flegmatick, Cholerick, Melanchollick, Sanguine, and Wheyish; which either do molest the Membranes of the brain, especially the *Crassa Meninx*, or are diffused into the Channels thereof, and being there stopped of their course, they cause most acute pains: or they slide into the exterior windings of the brain, and by little and little, they distil into the substance of the brain, and the ventricles thereof; or into the hinder part of the Head, or the Petty-brain; or they descend into the lowest parts of the brain.

If the Humor ascend by the Carotick Arteries unto the brain, it may produce the same Diseases; now all Diseases that are caused by content, or sympathy, without matter, only by evaporation, are not so dangerous, as if they were bred within the brain, so as that the morbidick Matter should be therein contained.

Obstruction of the Cavities.

The brain, besides similar Diseases in Distemper, and Laxity, suffers also Diseases in Conformation, when as, according to the motion of the Moon, its bulk is en-

created

creased, or diminished; in the Disorder of its Passages, when the Channels of the *Dura Meninx* are obstructed, especially the fourth, which is called *Torcular*, or the *Pres*: which being obstructed, is thought to cause the Apoplexy, the passage of the Spirits to and fro being intercepted. Which I do not believe, because the Spirits are shed abroad into the inferior Vessels from that admirable Net of Arteries, called *Rete mirabile*, and that same Cavity being stopped, only the *Plexus Choroides*, being defrauded of its blood, is hurt.

The Ventricles are also obstructed, especially the fourth, which being stopped, present death follows, by reason of the stoppage of that continual influx of Spirits, which ought to be into the inferior parts, and the Marrow of the back. *Of the Ventricles.*

The *Choana* may likewise be obstructed, which intercepts the Efflux of serous and Flegmatick Humors, whereby flowing back into the brain, they may cause the Epilepie, or Apoplexy, and induce divers deadly Diseases. *Of the Choana; or Funnel.*

If the anterior, or foremost ventricles, are perforated into the Nostrils, the obstructions of those passages, will be very hurtful to the brain.

A fault of evil Conformation, cannot be amended exactly: by strengthening, and drying the brain, both the fore-mentioned may be helped.

The brain is *Inflamed*, not only the Meninges, or Coats, but sometimes also in the proper substance thereof; whence comes the Phrenzy, and *Siriasis*, or Dog-day madness; but not any *Paraphrenitis*. *Siriasis.*

Siriasis is termed from the Dog-Star; for in the Dog-Daies chiefly, it afflicts both Boys, and elder persons; and therefore it comes rather from an external Cause, as long abiding in the Sun, &c. than from any internal Cause: as a Phrenzy comes only from an internal Cause, whether it be Primary, or Secondary, by consent of other parts in a burning Fever. *Frenzy.*

The brain may likewise swell, by reason of a Commotion thereof from some internal Cause, it is called *Ecplexis*. Stupidity of the Head after a blow, is a bad sign, according to *Hippocrates*. At length these Diseases bring a Sphacelism in the brain, causing putrefaction, corruption, and mortification. *Tumors.*

Again, it is subject to a watry Tumor, either in its Circumference, or within the Ventricles. If in its Circumference it is termed *Hydrocephalos*, or the Water-Head; and at length the wheyish Humor slipping by little and little, within the Ventricles, causes the sleepy Disease, and after it the Apoplexy.

And these I take to be Diseases of the brain; however *Fernelius* has written; that all the Disorders of the Head, which have been observed by Experience, are symptoms, and not Diseases.

But he elegantly, according to his wonted fashion, does divide the Symptoms into three Ranks, with reference to the parts affected. Some possess the Membranes; some the Substance of the Brain; and some the hollow Passages. *Symptoms of the brain.*

In the *Pericranium*, and *Meninges*, Pains are caused. In the Substance of the Brain, which is the Seat of the Animal chief Faculties, are contained the Symptoms of Fancy and Reason depraved, such as are, Dotage, Melancholly, Ecstasies, Lycanthropy, Madnets. Also the Symptoms of Memory abolished, such as are Forgetfulness, Foolishness, Doltishness, and blockishness. Symptoms consisting in the Cavities, and passages, are very many, appertaining to Sense and Motion; and to sleeping and waking, as dead sleep, sleeping Trance. Symptoms of Motion are, Walking in ones sleep; to be taken stiff, as it were blasted, or Planet-struck; the Night-Mare, Convulsion, Falling-sickness, Unquietness, and tumbling, Shivering, Shaking, Trembling, Palsies, Feebleness of the Limbs, and Apoplexy. *Or in the Cavities, and passages.*

Symptoms in the undue proportion of what should be voided forth, do belong to the passages and Cavities, as a Catarrh, *Rheumatismus*, Bleeding at Nose. All these Symptoms aforesaid, I will now declare particularly. *Symptoms of the Membranes.*

The *Head-ach*, either occupies the *Pericranium*, or the *Meninges*; if the *Pericranium*, the pain is outwards; if the *Meninges*, the pain is inward. Each of these pains reaches unto the Eyes; because the internal Membranes do produce the Coats of the Eye, called *Cornea*, and *Uvea*; and the *Pericranium* produces the Coat *Conjunctiva*. *Pain.*

The kind of the Pain shews the Nature of the Disease. A sharp and biting pain does argue a Cholerick Distemper of the Head: a heavy pressing pain, shews a Flegmatick Distemper: a panting, or pulsing pain, argues somewhat of an Inflammation: A pricking pain shews an Erosion, or gnawing, caused by a sharp Humor, or a Worm which is rare. A stretching pain, argues abundance of Humor, or of windy Spirits, which distend the Membranes.

Now the Pain is either in the whol Head, or in the half, or in some one particle thereof. If it infest the whol Head, it is called *Cephalalgia*: if half the Head, *Hemicrania*, because the brain is divided into two parts: If the pain possels one part, as if a Nail were driven in there, the Arabians call it *Clavus*, and *Ovum*; the Nail, or Egg. If the pain of the Head, be of long Continuance, it is termed *Cephalaea*; which together with the *Hemicrania*, is periodical; but the *Cephalalgia* is a continual universal Head-ach.

A continual Pain of the Head joyned with a continual Feaver, and signs of malignity, is exceeding dangerous, according to *Hippocrates* in the Second of his Prognosticks.

Pains of the Head are, *Primary*, and *Proper*; or *Secondary*, and by *Sympathy* from other parts: These are not so dangerous as the former.

Symptomes of the Substance of the brain. The Principal Actions of the Brain, Imagination, Ratiocination, and Memory, are diminished, depraved, and abolished. *Depravation of the Fantasie and Reason*, is Raving; the *Imminution* thereof is Foolishness.

There is a three-fold *Hurt of the Memory*; but the Abolition thereof has only found a name, being called *Oblivion*.

Foolishness. The Cause of *Foolishness*, is every great distemper of the brain, which is known by its Causes, as by signs; or some ill shaping of the Head, which is easily discerned.

Dotage. *Dotage*, or *Raving*, consists in absurd Thoughts, Words, or Deeds. The Sayings of such as rave, are estranged from Truth and Reason, or not to the point in hand; their Deeds are either unusual, or undecent; their Thoughts are absurd, ridiculous, and Chimerical.

Melancholy. The manner of Raving, ought to be distinguished to know the differences of the Melancholly which causes the same; for a *Delirium*, or raving with depravation of the Fantasie, is termed Melancholly, which consists in a false Opinion touching things past, present, and to come; which being manifold, it is defined by vain fear, anxiety, or sorrow.

Again, Melancholly is either *Primary*, or *Secondary*: The Primary has its Original in the brain; the Secondary springs from the Hypochondriacal parts, whence it is termed *Hypochondriaca Melancholia*, which is either Humoral, or Flatulent: the former is the worse of the two, and brings at last Madnes, and Out-ragiousness.

Ecstasie. The Melancholly *Ecstasie*, is an excess of Melancholly, which is three-fold: An Ecstasie simply so called; an Ecstasie with silence; an Ecstasie with a Frenzy: they are caused by black Choler, according to the divers degrees of its Adustion.

Foolishness with laughter is better and safer, than with seriousness and fierceness. Raving without a Feaver, is so much the better by how much the Parts under the short Ribs, or the Brain, are less heated.

Coma, or Dead sleep. The Resting, and binding up of the Sences, is Natural Sleep: The breaking off, or hindrance of sleep, is Watching: Either of which being out of measure, is hurtful. If Sleep be profound, 'tis called *Coma*, or *Carus*, Dead-sleep. If this Symptome be mixed of Sleep and Watching, so that the Patient seems to incline to sleep, with his Eyes shut, but is not able to sleep; it is termed *Coma-Vigilans*, the Drowzy Watch. But if one that has a sleeping Disease upon him, every time he is awakened, does rave, and talk idly, the Disease is called *Typhomania*.

The Night-Mare. And if a man lie stiff with his Eyes open, and when he comes to himself, remembers what was done about him, it is termed *Incubus*, the Mare; which is wont to happen

happen in the night to such as lie upon their backs, or have gluttied themselves with feasting; and it seems that they are choaked, by some Devil lying upon them, or by some Thief that has laid hold upon them to Rob and Murther them.

The abolition of all sense and motion saving Respiration, is called *Catalepsis* or *Catoche*: whereby a Man is Frozen as it were in that posture he was in when the fit seized upon him. It springs from a Cold distemper of the Brain with Flegm.

Catalepsis.

Carus is a deep Sleep; which comes upon Feavers and wounds of the temporal Muscles, or from an hot and moist distemper, or from much evaporation with serotities, moistening the substance of the brain.

Carus.

A Lethargy is an Inimination of sense and Motion and also of the Memory of necessary things. It Springs from a Primary hot and moist distemper of the brain, joyned with a putrid Humor which provokes a Feaver and cherishes and keeps it up a long time. There is also Dorage adjoyned. Touching this Disease there is a saying of *Hippocrates* in his *Coicks* Page 75. Which explains all the Symptoms thereof. The existence or particular Nature of the Lethargy and *Coma*, consists in a looseness, as that of the *Catalepsis* in a Tension or bending. Those that are in a Lethargick Sleep, at last become Apoplectick.

A Lethargy.

An *Apoplexy* does oft times primarily and unexpectedly invade a Man, and sometimes it follows some other Sleepy Disease. It is an Abolition of sense and motion with respiration hurt, which at last brings snoring and suffocation, by reason of thick Flegm flowing out of the Funnel and obstructing the Larynx or Weland.

An Apoplexy.

It is Caused by a Repletion of the Ventracles of the brain, either with a pituitous or Wheyish Humor, or with blood, some smal Artery of the *Rete Mirabile* being broken in the Basis of the Brain, or blood being carried aloft in a Plethorick body by the fourth Channel, rushes into the Ventracles.

If it be Simple and meer Whey, by strength of Nature out of the anterior Ventracles, it slips into the fourth Ventricle, and from thence into the Spinal Marrow and so Causes a Palsie.

If it be a Flegmatick Humor stopped in the fourth Ventricle, or in the third, it cannot be discussed, and the brain is overwhelmed thereby.

If the blood be shed out of the vessels, it suddainly suffocates.

In the *Carus* or other Sleepy Disease, only the foremost Ventracles of the brain, are overwhelmed with Serotities, so that there is yet freedom for the spirits to pass into all Parts of the body.

But in an Apoplexy, all the ventricles of the brain, but especially the fourth, are obstructed, and unless the matter be discussed into the spinal Marrow Death follows unavoidably.

Fernelius avouches that an Apoplexy is bred by an Obstruction of that *Rete Mirabile*, the afflux of Arterial blood out of the Heart into the brain, being thereby intercepted. There ore they are termed *Carotides*, because being obstructed they cause *Carum* or the Sleepy-Evil.

In the Apoplexy and Sleepy Diseases, besides general Medicines, as blood-letting liberally twice or thrice repeted out of the Arm and foot; strong Purgation of watry Humors, Cupping-Glasses fixed unto the shoulders and the hinder Part of the Head, Topical Remedies, are not to be neglected, which draw and Evacuate near the Part affected; such as is the opening of the Veins under the Tongue and of the external Jugular Vein, and likewise of the Temporal Artery: great Vesicatories applied towards the top of the shoulders to the Cephalick Vein, strong Medicines to provoke Sneezing, a Seton in the Neck, the string being often drawn about and anointed with Oyl of Vitriol, that it may bite the more and attract: opening the Veins of the Nose after the manner used by the Ancients, with a split Toothed Quil thrust up as far as the bottom of the Colander: a sharp injection into the

*Cure of the
Apoplexy, Carus
and such
like Diseases:*

Nostrils

Nostrils by a syring, and within the furrows placed between the spaces of *Os Vomeris*: drawing out of the Flegmatick clammy matter which sticks in the Throat and stops the Larynx, but thrusting a feather far into the throat: to which intent a strong vomit is good to cast forth any Humor that has flowed into the Wind-Pipe: neither must we omit extream hard rubbings with salt, and continual stirring of the body, if it be possible.

All which remedies are to be applied with all possible speed one upon the Neck of another, in an Apoplexy, because there is danger in delay. In Sleepy Diseases which proceed slowly, and are caused by matter falling down from the Parts above, they are more slowly administered, and without Precipitation.

You shal observe also, that a great Part of these Humors is gathered together in the turnings & windings which are outmost in the upper substance of the brain, which do either putrifie there, or slip into the ventricles of the brain: and yet these windings of the brain are not considered.

The Palsie. The Palsie is an Abolition of sense and motion, not in the whol body; as in the Apoplexy, but only in the greatest Part of the body, or in half thereof, which is termed *Hemiplegia*, or in one Part, which is called *Paraplegia*.

Fernelius observes, that sense is taken away, the motion remaining unhurt: and sometimes motion is taken away and the sense remains, because of the difference of the Nerves of the brain and the Spinal Marrow. In the Palsie, the Nerves of the Spinal Marrow are obstructed, but those of the brain, not: and therefore many Parts remain unhurt, especially the internal.

Sometimes the Palsie happens without obstruction of the Nerves, because the softning and Humectation of the Nerves, brings a kind of Palsie.

Stupor. In an imperfect Palsie when motion and sense are only dulled, the Disease is termed *Stupor* or *Nothrotis*, which arises from a moist distemper of the brain. A Stupidity or dulness of sense and motion in a Fever, is wont to foretel a sleepy Disease to follow. When it comes alone without a Fever, it foretels a Palsie or an Apoplexy.

Vertigo. *Vertigo*, is a depravation of sense and motion, which makes the Patient think that all things turn round: it springs from a windy Humor, which being agitated within the foremost Ventricles of the Brain, causes the foresaid Apprehension of all things turning about. If it Causes a darkness before the Patients Eyes, it is called *Vertigo Tenebricosa* or *Scotodinos*. It arises from the Brain or from vapours ascending from the inferior Parts. That is worst which arises primarily from the brain, and it is a fore-runner of the Falling-Sickness.

Convulsion. The *Convulsion* is a violent pulling back of the Muscles towards their Head or beginning. It is threefold, *Emprostotonos*, when the body is bent foreward; *Opisthotonos*, when the body is drawn backward: and *Tetanos* when both sides remain stiff, by reason of an equal bowing or stretching of the Muscles on both sides.

The Cause of a Convulsion, is either an obstruction of the Nerves, or their being pricked by a sharp Humor, or a dry distemper, which dries the Nerves, and so makes them stiff as a dried Lustring; this is incurable. In one word, all Convulsions are said to arise either from too much emptyness, or over fulness.

Falling-Sickness. An Epilepsie or Falling-sickness, is a Convulsion of the whol body, coming by fits, and hurting the Mind and senses. It is caused by an obstruction of the foremost Ventricles of the brain, caused by an Abundance of sharp Humors, either, Cholerick or Flegmatick. Either it comes from the brain Primarily affected, or from some other Part sending Malignant Humors to the brain. If it proceed from the brain Primarily affected, it is the more dangerous: it by fault of the Spleen or some other Bowel venomously infected: the coming of the fits may be

be foreseen and prevented. The former comes in a moment, the latter by degrees.

Fernelius, besides the Humor which is the common Cause, accounts the peculiar Cause to be a venomous Air or vapour, which is exceeding hurtful to the brain; and therefore he conceives, it must be cured with specificks and appropriate Remedies, as well as those vulgar ones.

Trembling is a depravation of Motion through weakness. It is caused by the weakness of the motive faculty and the bodies heavyness. So that look how much the motive faculty endeavours to lift up the Member, so much does the heavyness of the said Member not sufficiently illustrated with spirits, press it down again. And therefore it arises, from obstruction of the Nerves, or from their being over-much softened, or from some external Cause, as by anointing with Quick-silver, or other Application thereof. There is a certain mixture of the Convulsion and tremblings, which is called *Spasmo-Tremor*.

Trembling.

Shivering and shaking, are motions of the body, which happen in Feavers, and they are forerunners of the fits of Agues, or of the Exacerbations of Feavers. They happen also, to such as have ripe Impostumes, when the Impostum is ready to break. And therefore *Hippocrates* observes a threefold Shaking-fit; the one feaverish, the other Ulcerous, and the last Symptomatical.

Shivering and Shaking.

Unquietness, Anxiety, tumbling and tossing of the body this way and that way, called by the Greekes *Assē*; is a depravation of motion, which proceeds from a misaffection of the Stomach, by reason of a sharp Humor Nettling and Stinging the Nerves of the body, or the Membranes of the Back-bones Marrow. Which makes that the Sick cannot rest in one place or posture; but are forced every foot to change place and tumble here and there, and to change the posture of their Bodies.

Tumbling and Tossing.

Night-walking, ought to be reckoned among the Symptoms of motion depraved: because it is not preformed by Judgment and Reason, but by force of a Disease, namely of sharp Fumes which compel the Sick person or the healthy to rise up and walk in their Sleep.

Walking in ones Sleep.

I proceed to the Irregularity of the Excrements. The proper excretion of the brain, is either an Exhalation of a thin Vapour by the seames of the Scul or the pores of the Skin, or it is an Efflux of a thick Humor by the Nostrils and Palate of the Mouth. The Disproportion of this Excretion consists either in excess or defect. That in defect has no Name, but it degenerates into a Cause of Diseases of the brain, of which we have already spoken.

Symptoms of things voided forth.

The disproportion in Excess is various, either when blood does immoderately flow from the Nose, or by drops. Both which Symptoms are Malignant. The former decays the bodies strength, by reason of the loss of blood and Spirits, the latter betokens a repletion of the Head, and a Vain endeavour of oppressed Nature, And therefore drops of Blood coming from the Nose, is bad in a Vaporous Feaver, both as a Cause, and as a Sign.

Nose bleeding.

The disproportion in Excretion of a serous and Phlegmatick Humor, is many-fold. Their general Name is a Catarrh, which is a distillation of Humor from the Head into the Inferior Parts, from which Parts it receives divers Appellations. If it fall into the Nostrils, it is called *Coryza* or *Gravedo*; if into the Throat *Branchos*, Hoarsness; if into the Mouth and Palate *Ptyelismos*, or the Spawle. And these three sorts of Catarrhs, are vulgarly comprehended under the Name of Rheum.

Catarrhs.

A Catarrh falling upon the outward Parts of the body is named *Rheumatismus* or *Rheumaticus* affectus, the Rheumatick Pains. If it fall upon the Joynts it resembles the Gout, save that it comes not by fits: wherefore an Eunuch may suffer the Rheumatick pains, but not the true Gout. See *Galens* Comment upon that Aphorisme. Boys and Eunuchs are not troubled with the Gout.

Rheumatismus

Galen

Galen makes frequent mention of the *Rheumatick* Disease, which was common at Rome, as it is with us in *Paris*: in his Second Book to *Glauco*: in his Book of Blood-letting, against *Erasistratus* &c. This Disease he cured by liberal Bloodletting. It is described by *Hippocrates*, in his Book of the internal Diseases, under the Name of a Joynt-pain, which is wont to trouble young People more than Aged.

The other differences of Catarhs with Reference to the diversity of Parts on which they fall, are Vain. It suffices to know, that all Fluxions upon internal Parts, are called likewise Rheums.

The Cause of a Catarrh or Flux of Rheum, is a cold and moist distemper, or an hot distemper with an abundance of Humors working in the Vessels, or without. Galen acknowledges both these Causes, in his Comment upon the 24. Aphor. Of the third Book.

The latter Physicians, following the Doctrine of the Arabians will have the Humor which Causes the Catarrh, to be bred in the Head, only without the Vessels, by reason of Vapours ascending.

Fernelius contends that the Conjunct Cause of a Catarrh, is a serous matter, collected under the Skin of the Head, without the Vessels: and that the Antecedent Cause, is an Humor shut up in the Veins. If you desire to know more of this subject, Read *Fernelius*, who will give you abundant satisfaction.

Chap. 3. Of the Eyes.

The Eyes.

Because the Eye and the Ear may be demonstrated without meddling to dissect the Face; I will dispatch these Parts, before I proceed unto the Countenance.

Situations.

The Eye, the Instrument of the Sight, is the principal Part of the face, placed in the Fore-Part of the Head, to direct the Actions of the body, because all actions are directed forwards, by reason of the Situation of the Hands. Seeing it is an

Parts.

Organical Part, made up of many Similar Parts; some of those Parts are external and some internal. The external are the ^a Eye-lids, which are the Coverings of the

The Eye-lids.

Eyes, wherewith they are covered, shut and opened. And therefore each Eye-lid is movable, howbeit the motion is more evident in the upper Eye-lids, and is performed by help of Muscles, of which we shall treat in our fifth Book containing the History of Muscles. From whence the Reader may fetch what does appertain to the present occasion.

Its Membrane.

The Eye-lid is made up, of the Skin, a Membrane and muscles. The Membrane stretched out under the Skin, is produced from the *Pericranium*, which descending by the length of the Forehead unto the Eyes, is an underwife for the Eye-brows, withal makes the conjunctive Coat of the Eye, which being fixed to the Brain of the Socker, detains and binds the Eye in its Hole or Cavity.

Tarsus.

The Extremities of all the Eye-lids, are terminated with a Cartilaginous or Gristle edging, which is called ^b *Tarsus*, whereupon one by one in a row are fastened the ^c Hairs of the Eye-lids; which are born with us, and look how long they are at our Birth, the same length they keep, during our whole life.

Cilia.

They seldom fall off by reason of Sickness, unless in a Malignant Whores-Pocks, which mows down and makes wast of all the Hairs of the Body. These Hairs of the Eye-lids are termed *Cilia*.

Corners.

The angular Extremities of the Eye-lids meeting together, are termed *Anguli*, the corners of the Eyes. The one is ^d greater, towards the Nose; the other is ^e lesser, towards the Temples.

Tear-Spouts.

In the Eye-lids by the greater Corners are observed two little ^f holes, which are termed *Puncta Lachry malia*, or the Tear-Spouts, because the superfluous Humidities of the Eyes, or tears, do flow thither and Issue out of those Holes; which

Humidities

Humidities to receive, the *Glandula Lacrymalis* or ^a Tear-Kernel is ordained, being thrust into the little perforated bone, that the Humor might rather distil through this Hole into the Nostrils, than fall out upon the external Parts.

The upper Eye-lid has a Muscle that lifts it up termed therefore ^b Levator or the Lifter, which arises from the bottom of the Orbita or Socket and being spread out upon the Muscle which lifts up the Eye, it is ^c widened into an Eye-lid, that when the Eye is lift up the Eyelid may therewith be raised. Muscles

The *Musculus latus*, or broad Muscle is common to the two Eye-lids, which being Circularly derived from the bony brim of the of the Socket, is spread out through both the Eye-lids, that it may serve to shut them both: and because it reaches in the upper Part as far as the Eye-brow it draws that likewise down, in a strong and close shutting of the Eye-lids. Unless any man will contend, that there is a distinct Muscle for that use.

Now the Eye-brow is a Fleishy Hillock, adorned with Hairs, which serves for a Penthouse to overshadow the Eyes; it is depressed by the Orbicular Muscle of the Eye-lids, and lifted up, by the frontal Muscle. Eye-brow.

These things being observed, the Eye-lids are cut away, and the Circular adhesion of the Conjunctive Coat unto the Eye; that the Eye may be viewed, which is compact and made into a round ball or Globe of the fat which is placed ^d round about the same, to stop up the chinks and to make it more movable; and of six Muscles for motion; and of Coats, Humors, Veins, Arteries and Nerves. Parts of the Eye.

Before the Fat be removed, the two Glandules or Kernels are to be considered in their Situation, of which one is of the greatest moment, *Viz.* The Lachrymal or ^e Tear-Kernel; whose substance you shall observe to be Fleishy, soft and small; and its Situation to be within a little bone, beneath the same. Fat

^a T. 19. f. 1. ^b f. 1. C C. ^c f. 1. beneath B. ^d f. 1. by D. ^e f. 1. E. ^f f. 1. d d.
^a T. 19. f. 1. D. ^b f. 1. A A. ^c f. 1. B ^d f. 2. A A. ^e f. 1. D. ^f

Then you shall look out the other Kernel which is wholly unlike the former, placed in the other ^f Corner; which is flat, White, and like other Kernels. Kernel.

The Fat being carefully taken away, the ^a six Muscles present themselves; in the investigation whereof, we must begin at the ^b Trochleator, or the greater Oblique Muscle, Situate at the greater ^c Corner; and there we must be careful to preserve the ^d pulley, being a little strong Gristle fastened to the bone, beneath and close by the *Caruncula Lacrymalis* or ^e Tear-spout; through which Gristle (like a Rope through a Pulley) the round Tendon of the Trochleator is drawn, and inserted into the upper Part of the Eye.

The other, Obliquus ^f Minor, must be sought for in the inferior Part of the Socket, being round back under the Eye, it is terminated by the lesser ^g Corner. The other four, are right Muscles, whereof one ^h lifts up, and its opposite ⁱ draws down; the remaining two draw towards the ^k Sides. They all take their original from the Cavity of the Socket, by the hole of the Optick Nerve, and each one is produced right forwards to the Conjunctiva.

These things being observed, the Eye must be pulled out, that the inward structure thereof may be made to appear: and in the first place you shall observe two true Coates of the Eyes, which are orbicular as the Eye itself: the rest are imperfect coates: and before you cut asunder the Cornea or Horny-Coat, you shall take away the Nervous productions of the Muscles of the Eye, which some would have to be a ^m Coat, which is absurd. True Coat.

You shall observe that the Cornea or ⁿ Horny Coat is transparent before, to serve the sight, but behind and on the sides, it is dark. 1 Cornea.

Its thick^o Substance, is divided into little Skins, especially on the fore-side; when it is cut, presently the watery^p Humor Runs out, which is also found Circumfused about the *Uvea Tunica*, or Grape-Skin^q Coat, if the *Cornea* be divided in the hinder Part: this Humor cannot be stopped, because it presently Occurs, flowing out like Water.

f f. 1. E. ^a T. 19. f. 2. B B B. ^b f. 3. F. f. 4. F. ^c f. 1. by D. ^d f. 3. G. ^e f. 1. D. ^f f. 3. and 4. E. ^g f. 1. E. ^h f. 3. 4, 5. A. ⁱ f. 3. 4, 5. B. ^k f. 3. 4, 5. C. D. ^l f. 2. C C. ^m f. 5. a a a a. ⁿ f. 6. A A. B B. ^o f. 8. C C C. ^p f. 9. D D. ^p f. 7. A A. C C. ^q

2 *Uvea*.
Pupilla.
Iris.

Afterwards you shal see the ^a *Uvea* or Grape-Skin Coat, and its open hole, which makes the ^b *Pupilla* or sight of the Eye; the external Face or Circle of the *Pupilla* is termed ^c *Iris*, or the Rain-bow. The Circumference of the *Pupilla* is adorned with smal threds or little Fibres extended upon the Chrystalline Humor, which they retain in its Scituation.

The *Pupilla*, in Catts, is manifestly moved, in Men it is unmovable, unless it be somewhat slackened and straitned, by the Access and Recess of some extraordinary light.

These things being observed, pour out the Humors, and you shal find the ^e Chrystallin Humor overwhelmed in the Vitreous^f Humor, and then the interior^s Superficies of the *Uvea Tunica* wil appear black, and cleane; in Brute Beasts it is varigated, being tainted with Green Black and Sky-Color. Wherefore, when you are to demonstrate the Eye, you shal have an Ox and a Sheeps-Eye in readiness, that you may compare them with the Eyes of Man-kind.

In the hinder Part of the *Uvea* you shal see the Optick^h Nerve fastened, and the Marrow thereof piercing within that Coate.

The three Hu-
mors of the
Eyes.

The watry.
Chyrtallin.

The Glasse.

Their Vessels.

There are three Humors contained in the Eye; the first is the ⁱ watry Humor, already run out, there remain two fastened together, the Chrystallin and the Vitreous. The Chrystal is like a ^k Vetch, transparent, and being placed upon letters in a Book, it makes them shew larger, as a spectacle is wont to do. There is a Membrane attributed thereunto, termed ^l *Chrystalloides*. *Hippocrates* saies that in living Creatures it Runs like Water, or is more liquid at least.

The Chrystallin Humor being pulled out, there remaines the ^m Vitreous Humor, being compacted and not running about, by means of the *Reticularis Tunica*, or ⁿ Net-like Coat Interwoven: which being ^o cut asunder, by frequent chopping of the Pen-Knife thereupon, it becomes Liquid and runs about, the threddy Fibres being cut in sunder.

The *Veins* and *Arteries* which accompany the Optick Nerve unto the Eye, are more easily observed within the Brain, than in the Eye after it is pulled out.

Neither is the motive Nerve so easily detected being dispersed among the Muscles, as it is within the Brain, while you observe its progress, even to the very Eye-hole.

^a T. 19. f. 7. A C C. f. 8. B B B. ^b f. 7. a. ^c f. 5. b b. ^d f. 7. B B. f. 9. B B. ^e f. 9. A. ^f f. 9. C C. ^g f. 7. C C. ^h f. 3. I l. f. 4. K. f. 6. C. f. 8. D. ⁱ f. 9. D D. ^k f. 9. A. ^l f. 9. within A. B. a Circle ⁿ f. 8. A A. ^o T. 19. f. 8. a a. ^q

The Medicinal Consideration.

There are di-
vers Diseases
of the Eyes.

Although the Eye be but a smal Part of the body, yet is there no Part afflicted and destroyed with more Diseases. And therefore the ancient Physitians, when they had diligently examined the structure thereof, they observed so many and so divers

divers disorders in its Parts, as did amount to about one hundred and twenty, partly Diseases, and partly Symptomes, and distinguished them by their Proper Names; which in other Parts they did not do. And Rome and Alexandria had Physicians that attended only the Cure of the Eyes. In imitation of them I shall declare the disposition against Nature happening to the Eyes. And because most of the Names are Greek, few of them Latin, and our Chyrurgeons use them: after the example of *Leonardus Fuchsius* in his Medicinal Institutions, I wil retain and use them as Latin Names.

An Arabian Physician, *Haly* by Name, has writ a Book by it self of Diseases of the Eyes: and there is a considerable French Book of the same Argument written by *Jacobus Guillemean* the Kings Chyrurgeon: unto which you may add if you please the Author of *Medicinal Definitions*: the Book of *Galen* touching the differences and Causes of Symptomes; and a bastard Book de *Oculis* attributed to him.

The Eye therefore is afflicted either by being encreased, or diminished in its Quantity. Diseases of Magnitude.

The Eye is diminished, when it consumes for want of nourishment: its Magnitude is augmented when it swells without the Eye-hole or Socket.

Its Scituation is changed, when it falls without the Eye-hole, which Disease is termed *Ecpiesmos*: or if it turn to one side or another, as in Squint-Eyed People, and in him that saw through his nostrils and was therefore called *Rhinoptis*. Of Scituation.

There ought to be two Eyes: and therefore he that wants one, is diseased in Number, and is called *Monoculus*. Number.

Furthermore the Eye is troubled by an hot and a cold Distemper and by inflammation of the whol body, which by putrefaction of the Humors is turned into an Impostume. It is sometimes Ulcerated, whence the Eye becomes spoiled and the sight diminished. Distemper &c.

And in case an Inflammation of the whol Eye turn to Suppuration, which is called *Hypopyon*, and transparent matter be collected under the *Cornea Tunica*, shewing that the other Humors are not putrified, there is hopes the Patient may recover sight, the quittor being let out, by pricking the *Cornea*: which is happily practised at *Paris*; and so with the Quittor a watery Humor is let out, as in the couching of a Cataract.

Besides these general Diseases, al the Parts whereof the Eye is made up, have their Diseases and Symptomes, which I will particularly and breifly explain, beginning at the Eye-Lids. Special Diseases of other Parts.

Eye-Lids Diseases.

A moist distemper of the Eye-Lids with wind, or a flatulent Spirit, is called *Emphysema*. With much Wheyish Humors, its termed *Hydatis*, and by *Celsus* *Vesica*, and *Aquua*, which does so load and depress the upper Eye-Lid, that it cannot be lifted up. as
Emphysema.
Hydatis.

An hot distemper of the Eye-Lid, Joyned with a thick Humor, is cald *Sclerophthalmia*, Hard-eyedness. Sclerophthalmia.

A dry distemper without Humors, is *Xerophthalmia*: if it cause Itching, *Pso-rophthalmia*. Unto which may be referred the *Pthiriasis*, or Lowlie-Evil of the Eye lid. Xerophthalmia.
Pso-rophthalmia.

If the said hot and dry distemper Joyned with a sharp Humor, do cause Redness, pain, and falling of the Hairs, it is called *Ptilosis*, *Milphosis*, or *Maddarhosis*. Ptilosis.

If it make the Inside of the Eye-Lid rough its called, *Tracoma*: which if it be great, so as to resemble the final Seeds that are in Figs, its cald *Sycosis*; if it be hard and of long Continuance, its Name is *Tulosis*. Tracoma
Sycosis.
Tulosis.

A little Tumor upon the upper Eye-Lid springing from a thick Humor, is called *Crithe*, the Barly-Corn. If it be greater and movable, because of its likeness to hail, it called *Chalasion*, the Hail-Stone. Crithe
Chalasion.

A Disease

Anchiloblepharon. A Disease of the Eye-Lids in Contiguity is, when the Eye-Lids stick unto the Coat of the Eye, or to one another, which Disease is called *Anchiloblepharon*: the cause whereof is an exulceration of the Coat or the Eyes, or the Eye-Lids: the exulceration being caused by an hot and dry distemper, with a sharp Humor.

Lagophthalmia. *Lagophthalmia* is a Convulsion of the upper Eye-Lid, or a drawing back thereof by reason of a Cicatrice or some seam. *Ippos* is the trembling of the said Eye-Lid: both these Symptomes come by Consent of the Brain affected and therefore they are dangerous.

Ectropion. *Ectropion*, Inversion, is a Disease of the lower Eye-lid in Situation of Figure: it is caused by a Scar without, or by an excrescence of internal Flesh.

Chalasis. *Chalasis*, or the looseness of the Eye-Lid, is caused either by a Palsie, through consent with the Nerves of the Brain, or by a moist distemper of the Eye-Lid: in both cases the Hairs are turned inwards.

Trichiasis. The generation of the Hairs or the Eye-Lids being depraved, is called *Trichiasis*, & *Dystichiasis.* it is twofold: when more are bred than ordinary, it is called *Dystichiasis*, when there is a row of Hairs more than usual. But when the natural Hairs are only longer and inverted, it is called *Phalangosis*: in both these, the Hairs prick the Eyes: it is caused by a moist distemper of the Eye-Lids, with much Humor which is not sharp.

Tear-Kernels Diseases.

Euchantia. The Caruncle or little bit of Flesh in the greater corner of the Eye, makes a Tumor against Nature, which is called *Euchantia*: the Diminution of the said Caruncle is termed *Rhyas*, which causes a dropping of moisture from the Eye.

Anchylops. Near the said Caruncle and the Nose, there breeds an Impostum through Inflammation, which is called *Anchylops*: which being broken and turned into a Fistula is termed *Aegylops.* The Diseases of the Muscles of the Eyes, as distempers, Laxity and solution of Continuity, are distinguished by the Names of the Respective Symptomes.

Diseases of the Tunica Conjunctiva.

Taraxis. The hot distemper of the Conjunctive Coat with Humor as blood or Choler, if it be light and proceeding from an external cause, as the wind or dust, or a blow, is called *Taraxis*.

Ophthalmia. But if it spring from an internal cause as a *Plethora* or *Cacochymia*, it is termed *Ophthalmia*. When it is but beginning, it is called *Epiphora*; which is a Name common to an Inflammation and fluxion.

Chemosis. And if the Inflammation be very great, so that it hinders the coming together of the Eye-Lids, and spoiles their Evenness, so that the white of the Eye becomes higher than the *Iris* and *Pupilla*, it is called *Chemosis*, as much as to say *Hiatus*.

Hypophagma. *Hypophagma* is a collection of Blood under the *Adnata Tunica*, or an effusion of blood out of the Capillary Veins into the *Adnata*, proceeding from a blow or bruise. There is a Disease of Number, in the *Tunica Adnata*, called *Pterygium*: and it is a certain Membranous Eminency reaching from the greater corner of the Eye to the *Pupilla*; or a certain hard knob of the *Adnata* it self: both springing from a moist distemper Joyned with a clammy Humor.

Phlyctena. *Phlyctena*, is a pustle or small Tumor of the *Adnata* or the neighboring *Cornea*, proceeding from a thick and sharp Tumor, so that it terminates in an Ulcer.

Botrion. And if it be hollow, it is called *Botrion*, or *Fossula*; if it become crusty it is named *Epicauma*. After the Ulcer follows a Scar, which is the Hardness and thickness of a Spermatick Part springing from a wound or Ulcer.

Diseases of the Cornea Tunica.

The Ulcers and Scars of the *Cornea Tunica*, have a great resemblance with the Diseases of the *Adnata*, in regard of neighborhood: yet are they distinguished, because the Ulcers and Scars in the black of the Eye, that is, in the transparent Part of the *Cornea*, belong only to the *Cornea*: such as is the *Cbeloma*, which is a broad Ulcer of the *Cornea*, about the *Iris*.

Cbeloma.

Argemon, is a round Whitish Ulcer of the *Cornea* towards the Circle of the *Iris*.

Argemon.

Scars in the Black of the Eye, or in the Transparent Part of the *Cornea*, do differ in the degrees of more or less. The greater Scar of the *Cornea*, about the *Iris* or *Pupilla*, because of its whiteness is called *Leucoma* and *Albugo*: if it be small it is termed *Nephelion* or *Nebula*, the Cloud: if the Scar be thin, its called *Acblys*, *Caligo*, a Mist or Darkness.

*Albugo.**Nebula.*
Caligo.

Diseases of the Uvea Tunica.

The rupture and Exulceration of the *Cornea*, is attended by a Disease of the *Uvea* in Situation, which is called *Proptosis*, *Procidencia*, when the *Uvea* sticks out above the *Cornea*.

Proptosis.

If the Extuberance of the *Uvea* be small, its called *Myocephalon* or the Flie-Head, because it resembles the Head of a Flie: if it be great, tis termed *Staphyloma*, because it resembles a Grap-Stone, or *Melon* as being like an Apple. If their be an inveterate Ulcer of the *Cornea* through which the *Uvea* falls out, its called *Elos*, *Clavus*, the Nail.

Myocephalon
Staphyloma
Melon
Clavus.

The Ulcers of the *Cornea* and *Adnata*, if they be Malignant are termed *Carcinomata*.

Diseases of the Pupilla.

The hole of the *Uvea* is termed *Pupilla* the Apple of the Eye. Between the *Pupilla* and *Cornea* there is a space, full of Spirit and Watry Humor.

There is a double Disease of that space: *Zinifsis*, springing from a dry distemper, which consumes the Watry Humor and Dissipates the Spirit; or from a wound, which lets out the Watry Humor, and suffers the Spirit to vanish and reek away.

Zinifsis.

The other Disease of the space, is an Obstruction from a corrupted Flegmatick or purulent Humor. If it proceed of a purulent Humor or Quittor, it is called *Hypopium*: if the Obstruction be caused by Flegm, its termed *Hypochyma Suffusio*. But *Hypopium* follows an Inflammation, and *Hypochyma* is caused for the most Part by a Congestion or Concretion of a thick Humor; if the Disease be proper or primary, and do not arise by consent from the Stomach, sending Vapors up into the Eye.

*Hypopium.**Suffusio.*

Fernelius saw a thick and perfect Suffusion bred in one daies time; for if a thick Humor suddenly falling into the Optick Nerve do blind a man in a moment: why may not the same Humor falling lower into the *Pupilla*, breed a sudden and perfect Suffusion?

The narrowness of the *Pupilla*, springs either from the first formation in the Womb; or from a dry distemper, and then it is called *Phthisis* or *Corrugatio*.

Corrugatio.

Galen writes that a small *Pupilla* from from ones Birth is occasion of a very sharp sight: but when it happens a while after, tis bad. In his first Book of the Causes of Symptomes. Chap. 2.

The Dilatation of the *Pupilla* is called *Mydriasis* or *Platu-Corie*. It springs from a moist distemper, or from a Rupture, or by breach of Continuity caused by a blow.

Mydriasis.

Diseases

Diseases of the ChrySTALLIN and GLASSIE Humor.

Distemper Diseases of the Vitreous and ChrySTALLIN Humors, are either a distemper simple or with Humors conjoynd; or such as happen in the consistence of the said Humors, viz. Thickness and hardness. The distemper of the Humors and Coats of the Eye, if it happen without a Tumor or an Ulcer, is commonly attributed to the weakness of the Faculty, and the quality and quantity of the spirits being misaffected: but neither of these is a Disease; they are rather effects of a Disease: for what is the weakness of a faculty other than *Actio laesa*, the action hurt.

Thickness of the Spirits. Thickness of the Spirits is caused by a cold and moist distemperature, either proper to the Eye, or by consent with the brain or some inferior Parts.

Their Paucity Paucity of Spirits comes from a dry distemper, either of the Eye or the brain: the Cause and fomentor of which distemper may be a Cholerick Humor not purged out of the body, being the cause and Effect of a distempered Liver.

Glaucoma The thickness and hardness of the ChrySTALLIN Humor is properly termed *Glaucomis* or *Glaucoma*, because the color thereof resembles that of an Owles Eyes: it proceeds from a cold and dry distemper, and is therefore familiar to aged Persons.

The Disease of the ChrySTALLINE Humor in respect of its Scituation, has no name, but if it be somewhat higher and flatter than ordinary, it produces a Symptome, whereby all things appear double.

Running out of the watry Humor. The watry Humor may run out, by a prick in the Eye, but it is bred again in Children, as *Galen* saw by experience, and as we may observe in Chickens.

Thickness of the Visive Spirit. The Visive or seeing Spirit implanted in the Eye, may become thick, and surround the ChrySTALLINE Humor with darkness and obscurity: as the implanted Hearing-Spirit of the Ear, being rendred thick, does cause deafness or thickens of Hearing.

Diseases of the Optick Nerve.

Obstruction The Optick Nerve may be troubled with any kind of distemper, and with solution of continuity; but the proper and usual Disease thereof, is Obstruction, which is known by a sudden blindness, the other Parts of the Eye being all sound: which made the Neotericks call this Disease *Gutta Serena*, and sometimes *Amaurosis*.

Amaurosis

Diseases and Symptomes of the Sight.

Cacitas Sight abolished is called *Cacitas* Blindness: when it is diminished only, tis termed *Amblyopia*, thick sightedness: and it is accounted twofold *Myopis* and *Nyctalops*: In the former the Patient is Pore-blind, and is fain to look close to what he would discern and to hold his Eye-Lids almost shut together. In the latter, the Patient can see only by day, but very little or nothing at all by night, or very obscurely: the other differences of sight diminished are comprehended under the general name of *Amblyopia*.

Hallucination Sight depraved, is a false perception of things before the Eyes: its termed *Parorasis* or *Hallucination*.

Causes of blindness. The Causes of these Symptomes, are no other than those Diseases of the Eyes, which we have before recounted. For the Cause of blindness is, the Obstruction of the Optick Nerve, *Glaucoma*, *Leucoma*, *Hypopion*, *Hypochyma*, *Proptosis*, the larger *Mydriasis*, a *Pterygium* or Film covering the whole sight of the Eye,

Anchylo-Blepharon. *Anchylo-Blepharon* or Gluing together of the Eye-Lids. Imminution or Impairing of the sight, is caused by the other Diseases of the Eye-Lids. As by a thin Scar of the Cornea, called *Nepheleon* and *Achlys*; and by a *Leucoma*.

Leucoma and a smal *Mydriasis*, which touches but Part of the Sight.

Dry distemper of the Humors of the Eyes cause *Myopis*: the over Humidity and thicknes of the said Humors, makes a Man that he cannot see in the Night.

Myopis
Nyctopis

The Causes of sight depraved is an *Hypopion* beginning; or an *Hypochyma*, Namely, when the Humor is not yet united and grown together, so that the visive Spirit can pass too and fro between the Parts of the Humor through the empty spaces: whence it is that some see flies as it were, and certain dark bodies, move before their Eyes.

When true objects presented to the Eyes, have a false Appearance, the sight is depraved, and termed *Amalops*: so all things appear Yellow, to such as have the Jaundice.

Hallucination
Amalops

But that kind of Symptome happens, when the *Cornea* which is spread out before the sight of the Eye, is infected with Blood or Choler.

The Animal action of the Eye is hurt sometimes, as Feeling and Motion: the Feeling of the Eye is hurt by extream Pain thereof, which notwithstanding, according to the Judgment of *Celsus*, remains within the Eyes, and draws not the Brain into consent, as Pain of the Eares is wont to do. The Causes of all Pains in the Eyes, is a distemper, or Solution of Unity.

Eyes pain

The hurting of the Eyes Motion, is either a Palsie, Convulsion, or Trembling. In the Palsie and Convulsion, the Eyes become stiff and fixed: in that sort of Convulsion called *Tetanus*, they are unstable, as in the Trembling.

Palsie
Convulsion
Trembling

The Natural Action of the Eyes, is likewise hurt, as *Nutrition*.

To the Irregularity of the Excrements of the Eyes, does belong the Involuntary shedding of Tears. Its caused by a moist or cold distemper of the Eyes, or from pricking by a sharp Humor, or some external Cause; or from the Erosion of that same Caruncle, which is in the greater corner of the Eye.

Flowing out
of tears.

Hereunto likewise belongs the filth of the Eyes, which is by the Greeks called *Leimai*: they are caused by an extream distemper of the Eye, which makes a dissolution or melting down of matter.

Leimai

The simple infirmities of the Eyes, are the spots and Scars of the Conjunctive and Horny Coates, which are both Diseases and Symptoms.

Spots

The Duskyne and obscurity of the Eyes, is when the Bal of the Eye, does not represent any outward object to him that looks upon it; which is a token of Death in an Acute Fever.

Obscurity

Chap. 4. Of the Ear.

THe Ear, being the Instrument of hearing, is divided, into the ^a External Part, broad and gristly, and the ^b Internal, which lies hid in the *Os petrosum*.

The Ears Parts

The external Part is termed ^c *Auricula*, made up of a ^d Gristle, which is covered with a Skin full of ^e Folds, and made hollow, with divers ^f windings; with an hole ^g through the same placed upon the side of the Head, just against the hole of ^h *Os Petrosum*.

windings

It is more beautiful, when smal: for a great pair of Asses Ears are uncomely.

The Ear was placed as it is, for the Conveniency of hearing: and if the Scituation of the Ear inverted would not have been deformed, it had been more commodious for hearing, then placed as it is upright and Joyned to the Temporal Bone. For we see such as are thick of hearing, put the hollow of their hand behind their Ear, that they may hear the better.

In the Ear you shal observe two Parts; one is called ⁱ *Tragus*, and the other ^k *Antitragus* the Names of the other Particles of the Ear, are useless.

Tragus
Antitragus

In

Hole of the Ear In the Auricula is contained the first passage, or Hole of the Ear, and reaches as far as the ^m Tympanum or Drum: its entrance is fenced with Hairs, to keep out dust and crawling Bugs; that might otherwise enter in. There is collected, the **Ear-Wax** Choleric Excrement of the Ear, called Ear-Wax, which Bird-Limes and intangles any Dust or creeping thing that would pass that way. Its termed *Marmoratum*.

Concha The internal Ear Concluded in the *Os Petrosum*, is altogether boney, and divided into three Cavities. The first Cavity is the ^b Concha: In the extremity of the first ^c hole is the Membrane stretched out, which terminates upon the ^d Drum: it has a string that runs cross it, as we see the Military Drums have.

The Drum ^a T. 20. f. 1. and 2. ^b f. 3 4. &c. ^c f. 1. and 2. ^d f. 2. BB. ^e f. 2. A A. ^f f. 1. A A. BB. ^g f. 1. G G. ^h f. 3. A. ⁱ f. 1. G. ^k f. 1. D. ^l f. 3. B. f. 4. A. &c. ^m f. 4. BB. ⁿ f. 4. B. C. f. 7. within A. B. ^o f. 4. B B. f. 5. B. ^p f. 3 B. f. 4. A A. &c.

Four little Bones. Furthermore, we observe three little Bones, the ^e Mallet, the ^f Anvil, and the ^g Stirrup: others add a ^h fourth, which is a little Scal of a bone, such as is found in the Carotick Artery near the *Os Sphenoides*. But this is vain and unuseful.

Fortunatus Plempius places another Membrane at the other extremity of the Concha, but how or where it is extended, he does not explain: whether at the two petty windores, whereof the one is the entrance of the labyrinth and the other of the Cochlea, or elsewhere? It is a most hard peice of Service to find out and demonstrate the internal structure of the Ear.

In the Skuls of ⁱ Infants, and in a Calves-Head, it is more easily observed, by lifting up with a Pen-Knifes Edge that same portion of ^k *Os Petrosum*, which within the Scul reaches unto the Basis of the Brain.

In the Concha you shall observe on the left side an Hole, which passes into the winding Cavity of the *Apophysis Mastoides*, or Teat-like Production.

The Nerve The Auditory ^l Nerve, being ^m drawn through the ⁿ Cochlea, when it is come to the Concha, it slips through an hole or ^o Channel, which opens on the right side of the Concha, into the Pallate, by the Process which is termed *Apophysis Pterygoidea*.

And this is the natural structure of the internal Ear; for the finding out whereof we are obliged to *Fallopius*, after *Carpus*, who discovered those little bones the Hammer and the Anvil. The third, namely, the Stirrup, *Philippus Ingrassias* brags to have himself first observed.

Implanted Air In living-Creatures, there is an inbred and implanted Air in the Cavities of the Ears, as there is a visive Spirit in the Eye, shut up within the *Cornea Tunica*.

^e f. 4. G. f. 5. E. f. 7. A. ^f f. 7. B. ^g f. 7. C. ^h f. 7. D. ⁱ T. 8. f. 5. 6, 7, 8. ^k T. 20. f. 10. BB. ^l T. 8. f. 1. F F. f. 3. K K. T. 20. f. 12. A A. B B. ^m f. 10. A A. ⁿ f. 7. D D. f. 9. A. f. 11. B D. ^o f. 8. A. B B. ^p

The Medicinal Consideration.

Diseases of the Ear. The Gristle of the external Ear if troubled with Pustles or Pusshes, is contused, Swells, is inflamed and exulcerated. By cold it contracts Sphacelation, is contracted and dies do what a Man can: and its sometimes cut of both in sick and in sound Persons. Whence the Greek phrases *Coloboma* and *Acrotiriasmenoi*, for persons that are Crop-Eard.

Parotis what it is. The greatness of the external Eare, though it be ill favoured, cannot be helped. The Swelling and Inflammation of the Kernels which are beside the Ears, is termed *Parotis*, which in regard or the narrowness of the place and nearness to the brain, is not

not very safe, happening upon an acute feaver, though it have the name of *Dioscōuros* or *Castor* and *Pollux*, because of its good token, for such it gives when it is critical, proceeding from the strength of Nature, and attended with light somness of the Patient following the same. In Childten and young People a *Parotia* does many times break forth, void of danger, cauled by the over great moisture of their brains.

In the hollow behind the Ear, according to the advice of *Fernelius*, a Caustick must be applied, in Diseases of the Ears and of the Eyes.

The first Auditory passage of the Ear, because tis fleshy is obstructed by a Tumor, by a Caruncle or bit of Flesh growing up, or by quittor Issuing out, or by Filth, or somewhat from without. It is inflamed, and impostumated, and Exulcerated either of it self, or by means of some eating Medicine poured into the Ear: or by a Cholerick Humor: wherefore *Hippocrates* saies that when Deaf persons fall into Cholerick Loosenesses, their deafness is lessened, or taken away: and when their looseness is stopped, their deafness returns.

This passage is terminated inwardly by the Drum, which either of it self and primarily, or secondarily and by accident through consent of the Bowels, but especially through fault of the Head, is troubled with a very painful and dangerous Inflammation, which draws the brain into Sympathy.

The internal Cavities, because they have no *Periostium*, are not pained, unless the Auditory Nerve be affected, whose offspring makes the Drum: from its inflammation proceeds an Impostum and from that an Ulcer: which tears asunder the Drum.

It is broken, not only by an Ulcer, but also by a blow and a vehement sound; whence it is that those who dwell by the Falls of the River *Nilus*, are all deafe, by reason of Loud roaring and Headlong fall of the flowing Water.

Also the looseness and over great moisture of the Drum is to be considered, because it may Cause Deafness.

The proper Symptoms of the Ear, are those which belong to the hurts of hearing, and the Irregularity of Excrements.

The hearing is hurt in a threefold Manner. When it is abolished, it is called *Surditas*, *Deafness*: which if it come from the Womb and is born with the Patient, it is incurable: if it come by accident, it may be curable.

Hearing diminished is called *Barucoia*, thickness of hearing.

Hearing depraved consists in a noise and ringings or buzzings in the Ear; tis called *Paraousis*.

The Causes of Deafness and Thickness of Hearing are the same, save that they differ in Intension and Remission: and therefore the foresaid Diseases of the Auditory passage and of the Drum may cause these Symptoms.

Paraousis or Noise in the Ears springs from a distemper of the drum, being more moist or more dry than is fitting: which, as it causes a more exquisite sense than ordinary, so also does it cause a ringing in the Ear, as being affected with the very lightest motion of the internal implanted, or external Air, or while the spirits do continually flow into the Ears; which cannot be contained in so close a Room; or some Spirit may stir it self within the Dug-like Cavity.

Several sounds are imagined in the Ears according to the various motion and mode of the flatulent Spirit which causes the same. So that if it be thick, whisperings are heard and Hummings: if thin, Hissings: and when it moves by fits and starts, it presents a tinkling, as it were of bells.

Sometimes noises are imagined without any fault of the internal Eare, by consent of the Head, while the internal and external Arteries being hotter than ordinary, do beat more violently than they are wont to do, and do make a great sound in the Ears, if the Patient do lie upon one of them.

The differences and Causes of this seeming Noise in the Ears, are neatly expressed by *Fernelius* in his *Pathologia*.

In natural Deafness, springing from mis-formation in the Womb, and not from any of the Causes aforesaid: whether may we experiment that which fell out unexpectedly

Of the Auditory passage.

Of the inner Cavities.

Of the Drum.

Symptoms of the Action hurt. Deafness.

Thickness of Hearing. Noise in the Ears. Their Cause

Their Cure

pectedly wel to a certain Deafe man: who thrusting an Ear-Picker very far into his Ear, rent the Drum and Break asunder the smal bones and afterwards, attained hearing?

Whether in a ringing of the Ear may the teat like Proceſs be perforated, to let out the Spirits which make a tumult in that Cavity?

Whether does the thickneſs of the *Tympanum* hinder Transpiration? ſo that the flatulent Spirits cannot break out? whether or no wil it avail to rub the extremity of the Auditory Channel, behind the Grinding-Teeth, with Muſtard or ſome other opening Liquor?

Symptomes
of the Excre-
ments.

Excretion of
blood (Choler
serum, quittor
&c.

The Irregularity of Excrements in the Ear, is not only of Cholerick and Wheyish Humors, but alſo of quittor and blood, proceeding from the brain: neither is ſo great a quantity of quittor as is avoided, bred in the Cavities, but in the

If an intollerable inflammatory and pulſatory pain does occupy the hinder parts of the head, and the matter flows thither and there ſtops, the pain abiding: it wil be ſafe to boar an hole in the hinder part of the Head, that Egrets may be given to the quittor; when no great danger is like to follow from the ſaid operation.

Worms.

The Ear-Worms termed *Eblai*, which are voided from the Ears, belong to the Irregularity of things voided from theſe parts.

It is good in Children for the internal and external Parts of their Ears to run and void much Humor, becauſe it purges their Brain and prevents great Diſeaſes.

There is in Diſeaſes obſerved a great Sympathy between the Eares, Mouth, Lungs and Weſand: and therefore when the Ears are hurt, the voyce is changed; by reaſon of the Auditory Nerve, which being ſpread into the Throat, reaches as far as the Weſand or Wind-Pipes Head.

And when Nature has been accuſtomed to Purge out the Excrements of the Brain, by the Ears: the ſtoppage of that Purgation, has made many to die ſuddenly.

Chap. 5. Of the Face and outside of the Mouth.

The Face deſ-
cribed.

THE Face is the broad and fore part of the head, comprehending the Fore-Head in a living and dead Man without diſſection; and therefore the ^a Fore-Head, ^b Eyes, ^c Noſe, and Mouth with its ^d Lips, as far as the Chin, do belong unto the Face: which, as it is the ſubject of Anatomical diſſection, is divided into the Parts internal and external.

Its Parts.

The *External Parts* are the Scarf-Skin and the Skin, which are thin and very ſmooth in Women. The internal Parts, are the Muſcles of the ^e Noſe, ^f Lips, and inferior jaw, whoſe empty Spaces are filled up with fat.

Moreover the *Musculus Latissimus*, does cover the ſide of the Face, as far as the Fore-Head; yea and it compaſſes the whole Neck, excepting the hinder Part thereof.

The Muſcles of the Lips, are the Extremities of the Mouth: the other Muſcles which belong to the lower Jaw, as the ^a Temperal Muſcle, the Muſcle called ^b *Maſſeter*, poſſeſſing the ſides of the Face, ſhal be explained in our Hiſtory of the Muſcles.

The Mouth
deſcribed.

The Mouth therefore is a Slit in the Skin of the Face, neceſſary for breathing, ſpeech, and nourishment of the body: for by the Mouth we breath, ſpeak, and receive our Food.

The Lips.

The extremities of this Slit art termed ^c Lips which are moved by Muſcles in their opening and ſhutting.

The Chin.

The utmoſt bound of the Face is called the ^d Chin, as the upper extremity thereof from the Eye-Brows to the beginning of the Hairs is termed the ^e Fore-Head.

The

The sides of the Face are the ^f Cheeks. The internal Parts of the Mouth, as the ^s Teeth, Gums, ^h Palate, ⁱ Throat, ^k Tongue, shal be described in order. The ^l Larynx ^m Os Hyoides, ⁿ Pharynx, and the ^o Glandules, appertain unto the Neck.

The Cheeks.

The Face, besides Veins and Arteries has a notable ^p Nerve from the third pair, which is carryed along between two ^q boney plates, under the pavement of the Orbita or Socket of the Eye, and is branched up and down like a Gooses Foot, through the whol Face, by the Nose, as far as the Lips.

The Vessels.

^a T. 15 f. 3. A. ^b f. 1. between FF. T. 19. al. ^c T. 15. f. 1. G L. ^d f. 1. N N. ^e f. 1. G H I. &c. ^f f. 1. K L M N. ^g f. 1. R S T. &c. f. 2. A B C. &c. ^h T. 10. f. 1. g g.

^a T. 15. f. 1. P P. ^b f. 1. S. ^c f. 1. N N. ^d f. 1. n. ^e f. 3. A. ^f f. 1. O. ^g f. 6. m n o. ^h f. 6. L L. ⁱ T. 13. f. 15. A. ^k f. 14. A &c. ^l f. 9. 10. &c. ^m f. 11, 12, 23. ⁿ T. 3. f. 2. 3. ^o f. 16, 17. &c. ^p T. 18. f. 2. A. ^q f. 2. c c. &c.

The Medicinal Consideration.

The Skin of the Face, is the Looking-Glass wherein are seen the Diseases of the Body, especially of the Liver, Spleen and Lungs: for look what Humor bears sway in the bowels, the same shews it self forth in the Face. If there be a lasting Ruddynefs in the Cheeks, it is a Sign of an hot Liver: if the Rednefs be seated upon upon the balls above the Cheeks, it argues an hot distemper of the Lungs. If Choler stick in the pores of the Skin, it causes Freckles: if the Color proceed from being in the Sun, it is termed *Ephelis*. If Rednefs remain settled on a great Part of the Face, it is named *Gutta Rosacea*, and those who are spotted on that manner are termed *Antirhoei*.

Diseases of the Face.

Sunburning.
The Rose.

Palenes is commonly seen in Virgins and such as are recovered out of some Sick-*Green-Sicknefs* nefs.

The *Green-Sicknefs*, is a slow Feaver in Virgins and other young Women that want their Courses.

In such as are sickly and crasie, the Color of the Face is without blood because the whol Mass of blood is Wheyish, and therefore the blood of the Face being such, must needs be of an Wheyish Color. Those that are so affected, are called *Lip-bemoi*, blood-les. A bad Color of the Face, both in Sick and sound persons, is termed *Cacochroia*.

Furthermore, the Face is made rough and deformed by burning *Pustles*, *Ionthi*, *Vari*, *Fici*, *Nevi*, and *Spiloi*.

An hard Push is called *Ionthos*, because it represents a branch of the flowering Violet.

Ionthos.

Varus is an harder knob, and not so red and fiery as the *Ionthos*, *Ficus* is a certain Wart.

Varus.

Lichen, *Impetigo* or *Darta*, is a roughnefs or Scaly Eminence of the Skin, if it be dry; if it be moist, it Exulcerates and runs.

Lichen.

Nevi, Warts, are smooth knobs white or blewish: which if they be of a bad Color, they must not be tampered with, least some worse and cancerous disposition follow: and *Seneca* saies that a face without Warts or moles is not pleasing.

Warts.

It is a wonderful thing how these Warts of the Face do produce others in divers Parts of the body, which answer the measure of the Face as far as the Neck. Of which subject *Ludovicus Septalius* has composed a most Elegant Book.

Black and blew Color in the Skin of the Face, proceeding from a bruise, is called *Hypopium*.

Hypopium.

Spiloi are Sooty Excrements of the Skin, intruded into the pores thereof, which

Spiloi.

are pulled out, either by a pin, or by squeezing the Skin, or by some emollient Medicament or Pomatum, if they be hard and thick.

Pani

Pani, are scabs in the Face.

Mentagra.

Mentagra, an *Impetigo* or Dry-Scab of the Chin, which troubled the Gentlemen of Rome in Plinies time, where it was a Popular Disease: is a Malignant Scab, which remains many years and is hardly curable, and so alters the Skin of the Chin and Lips, that a Man continues Beard-less all his Life long.

Cynicus Spasmus.

The Action of the Skin of the Face being hurt is termed *Cynicus Spasmus*, The Dog-like Convulsion, or torture of the Mouth expressing the snarling of a Dog: for it is a depraved motion of the Muscles of the Face, belonging to a Palse or Convulsion.

If it be Paralytick the Retraction is made in the sound Part, because of the dissolution of the opposite Parts: If it be convulsive, the Part affected is drawn back: Those Nerves which are affected in this Symptome, do arise from the spinal Marrow between the second and third *Vertebra* of the Neck.

Galen attributed this depraved motion of the Mouth to the Muscle termed *Latissimus*.

Besides the *Cynicus Spasmus*, there is another Convulsion very ordinary, of the upper Lip towards the Eye, by the disorder of that same Nerve of the third pair described above, which being cut a sunder, below the Socket of the Eye, the said Convulsion is healed.

*Painting
Beautifying*

The particular medicining of the Face besides the universal, is twofold, the one called *Commotice* painting and plastering with *Fucuses* &c. The other *Cosmetice* beautifying and adorning without any thing laid on: the latter *Galen* allows to take away the ill favouredness of Women: but the former, he disallows in a Physician, and leaves it to panders, bawds and Whores.

The Use of those *Fucuses*, unless skilfully managed does quickly wrinkle the Skin, such as are the Spanish-White, and *Purpurissus* or Lovly-Red.

*The use of
the Lips.*

The Diseases of the Lips are very many, distempers, Inflammation, Swelling, Ulcers, and others consisting in evil conformation, all which pervert the use and action of the Lips which serve to shut the Mouth, form the speech and for the easie reception of meat and drink, to contain the Tongue within the Mouth, to cast forth the Spittle out of the Mouth, for Trumpeters to make a strong blast, for Infants to

*Diseases of
the Lips.*

Suck with, and both in Men and Women to express their mutual Affection by Kissing, and to beautifie their Faces: and therefore if a Mans Lips were cut off, he would appear very deformed, just like a snarling Dog.

In their Shape

Such as have great Lips and sticking out, are called *Labeones*: such as are born with imperfect or cloven Lips, are said to have an *Hares Lip*: this defect is amended by Surgery. If the Lips be loose and hanging, it proceeds from a Palse. He that has the insides of his Lips turned outwards is termed *Brochus*: and he that has swelling Lips is called *Cheilo*. Those are by *Arnobius* termed *Mentones*, whose Chins stick out.

*Chops
Tumors*

The Chops of the Lips are called *Rhagades*. Sometimes Tumors and little bladders break out upon the Lips, especially in Feavers, when Nature drives the virulent Humor out of the Veins and Arteries into the Lips, which *Avicen* saies is a good sign, that the Feaver wil quickly ceate: and experience does many times confirm the same. Yet sometimes Tumors and Ulcers in the Lips are in Diseases signes of Death, as in the two Brothers *Herimoptolemus* and *Andreas* in *Hippocrates*.

Ulcers

Bad Color

Bad Color of the Lips in Diseases is no good sign: in such as are wel, it argues a fault in the Lungs or in the blood.

*Moles and
Warts.*

Moles and *Warts* black and blew and Scirrhus sticking upon the Lips, are things to be warily handled, and not to be tampered with by way of Incision.

&c.

Sometimes the Lips do naturally Swel, especially the lower Lip, when the Jaw is drawn out, and then the lower Teeth before are higher than the upper, and include them:

The

The principal hurt of the action of the Lips, is depraved Speech. But this Symptome wants a Name.

Symptomes

The depraved trembling motion of the Lips, happens by consent of the Stomach distempered, by reason of a Membrane common to the Lips and Stomach. Whence it is that those who are ready to vomit; have a trembling in their nether Lip: which trembling is called *Seismos*.

Trembling

The opening of the Mouth is hurt, when the Jaw is become stiff and immovable: its shutting is hurt when the Jaw is Palsied, as in Feavers, by reason of the Heat of the bowels and Lungs, and difficulty of breathing.

Shutting

Much spawling, and want of Spitte, do belong to the Diseases of the Mouth, though they have other remote Causes: for Spitte is necessary for chewing of meat, for speech and Tasting; but immoderate Spitte is hurtful, and the voidance thereof is accounted filthy and undecent. Touching the Cure of Lips cut of, *Taliacotinus* has written.

Frequent spit-
ting.

Chap. 6. Of the Nose.

THe Nose, the Instrument of Smelling and of cleansing the brain, is placed in the middest of the Face; dividing the Eyes and Face into two even Parts.

The Noses Sit-
uation.

The length and breadth thereof is uncomly, if it exceed a Mans Thumb in length and thickness.

Magnitude

The Figure of a Mans Nose contributes much to his healthy living: for an high Nose is better than a flat Nose, and wide Nostrils are to be preferred before narrow ones.

Shape

It is divided into two Cavities, which are called Nostrils severed by a partition, and reaching as high as the Colander-bone.

Cavities

The Depth and Widness of the Nose, are greater within than they appear outwardly: for that same space which lies between the two tables or boards of the Palate and *Os Sphenoides*, divided into two Cavities by the *Os Vomeris*, reaching to the Partition of the Nostrils, belongs unto the Nose.

That space is filled up with *Spungy Bones*, which are portions of the Colander-bone. And those Spungy bones are filled with *Spungy bits of Flesh*, which drink up the Flegm which flows from the Head, that Snevil might not be alwaies dropping out of the Nose.

Spungy Bones
Spungy Car-
uncles.

These bones and Caruncles or Spungy bits of flesh do likewise serve to Filtrate and strain the Air, which, the Mouth being shut, is drawn in at the Nostrils, that it may be imparted pure unto the Lungs and brain.

The Nose therefore is compounded of bones, Gristles, Membranes and Muscles.

Bones

It consists of *Two Bones*, which stick outwards and fashion the same. *Five Gristles* are dependant upon those bones, two being lateral placed by turnes, and movable through the help of Muscles. They are termed *Pinnae* and *Ala Nasi* the Wings and Pinnacles of the Nose. There is a Gristle placed between them, which is called *Septum*, the partition, and depends upon that same boney partition, placed between the bones of the Nose, being a continuation of *Os Vomeris*.

Gristles

The Nose is cloathed externally with the *Cuticula* and *Cutis* under which lie the *Muscles*. The inner Parts of the Nose are invested with a Membrane sprinkled with fleshy Fibres, by the help of which, the *Pinnacles* of the Nose are contracted, when the breath is strongly drawn in; as the said Pinnacles are widened by other external Muscles, the description whereof you shal find in my History of the Muscles. Book the 5.

Membrane
Muscles

To the Nose do belong, the *Seive like plate* of the Colander bone, and the *Mammillary or Teat-like Productions* ending at these bones, and given out to be the Organs or Instruments of Smelling.

Some would doubt whether those *Caruncles* or little bits of Flesh which are thrust into the Spungy bones, are the proper Instruments of smelling, or only some way

way

way subservient thereunto; because when they are overmoistened, or by any Diseases impaired, the smelling is depraved, or wholly lost.

^a T. 15. f. 2. ^b T. 15. f. 3. R. ^c T. 15. f. 6. I. ^d T. 15. f. 1. G. H. & C. ^e T. 15. f. 5. C. C. ^f T. 18. f. 3. a a.

The Medicinal Consideration.

*Diseases of the
whol Nose.*

The Gristly Parts of the Nose, are Inflamed, Bruised, and Ulcerated; the bony Parts are broken; all of them are troubled with distempers, but especially with organick Diseases springing from a bad Conformation, as when the Nose is crooked inwards like a saddle; which is oftentimes caused by external Causes: but if a Child be born with a Saddle-Nose, it may be then raised and rectified. For as Plato reports in his *Alcibiades*, if the King of Persia had a Daughter so born; they did thrust Pipes into the Childs Nose, and reduce it by little and little to its right shape, by widening the bones and Gristles, whiles they were yet Waxy and pliable.

An over great and high Nose, cannot be cut shorter without making the party more deformed. If in persons grown up the Nose be Swelled with Tuberous Excrescencies of Flesh; that fault may be mended by cutting of the said luxuriating Flesh.

*Of the inside
Tubercula
Ozena*

The inside of the Nose is apt to Swell, and is infested with Inflammatory bunches, which come to suppuration: but far within in the Spungy bones and their Caruncles, there is bred a filthy stinking Ulcer called *Ozena*, which is offensive both to the Patients and all that come near them, and is very hard to cure. Sometimes the little bones are corrupted and come out at the Nostrils. The Caruncles being swelled with or without an Ulcer, cause the *Polypus*, which falls into the Nostrils, or it fills the hollow places above the Palate, reaching as far as the Throat.

Polypus

The *Polypus* is neatly described by *Celsus* in his sixth Book, Chapter the eight. Unless it be of a Malignant Color and painful, it may safely be cut away by the Roots, if possible, which is the true Cure, for otherwise it wil grow again, if any Part be left remaining after section.

A Malignant Cancerous *Polypus* must not be medled withal either by cutting, burning, or caustick Medicaments, for if it be exasperated it eates and devours the whol Face.

*Symptomes of
the Nostrils.
Smelling lost*

Diminished.

Symptomes of the Nose are either its action hurt, or simple affections thereof, or the Irregularity of what is voided forth: The action of the Nose is Smelling, which is abolished, diminished or depraved. The Causes of the smell diminished or abolished, are the same, to wit, the obstruction of the inward passages of the Colander-bones and the Mammillary productions, in which the smelling is exercised. If the foremost Ventricles be stopped, other parts of the Nose remaining intire, it is known by the perfection of speech, which shews that the Colander and Spungy bones with the Mammillary Productions, are free.

depraved.

The Smelling is depraved, when all things seem to stink, and when the Patient perceives a stink in his Nose, which is likewise discerned by the standers by. The true Cause of this Symptome, is a putrified Humor congealed in those Cavities. If the Putrefaction be within the Scul, the stink is not perceived by the Patient, but is discerned by those which converse with him, as *Fernelius* judiciously observes.

Spots

Simple affections of the external Nose, are spots which are black and blew or red, and deform the same. They must be taken away, or corrected with some Fucus, if there be no other Remedy.

*Nose-bleeding
Coryza*

The Irregularity of Excretions, consists in Bleeding at the Nose, and in a Flux of Serosities therefrom, which causes the *Coryza* or *Grauedo*, or a continual Nose-dropping. *Hippocrates* in his sixth Book of Aphorismes saies, Such as have running Noses, are unhealthy.

In bleeding at the Nose, the blood either comes from the Nostrils opened by picking, or from that same long Cavity of the *Dura Mater*, which reaches unto the Nostrils: if the Veins be opened by the sharpness of the blood or the abundance thereof, after it has flowed a while, it must be stopped by opening a Vein in the Arm, unless the blood flow critically.

Fernelius would have all bleedings at the Nose to be stopped, be they what they wil, and would have a Vein opened to that end, contrary to the Doctrine of *Hippocrates*. Blood coming from the inner Parts of the Nose may be stopped: but it is very hard to stop the same when it comes from the Menings or Coates of the Brain.

Dropping of blood from the Nose in burning and Malignant Feavers, is bad, both as a Cause and a signe: because it does not ease the Patient, and it shews a Plenitude in the brain, and that nature being weak is not able to disburthen her self. In such a case, great care is to be taken of the head by Revulsion, and Derivation of the blood, and by cooling of the Head, for fear of Inflammation or some Sleepy Disease.

If bleeding at the Nose be stopped in young people accustomed thereunto, and their brains Ake through fullness, they must be let blood.

The Ancients did open the inward Veins of the Nose, which Practice is left off, because the way they did it, is to us unknown.

Fernelius writes that Wormes as long as ones Finger have been found in Saddle-Noses, being there bred; which at last made the Patients mad and killed them: those Wormes were thought to have been cast out of the brain, where as indeed they were born and bred in the Cavities of the Nose. For Wormes bred in the Ventricles of the brain, cannot come out, unless they should eat a sinder or break the Sieve-like table of the Colander-bone.

That which *Fernelius* has written, is worthy of consideration in reference to Diseases of the Head. That in Nose-bleedings, the blood comes out not from the brain, but out of the Veins of the Nostrils. The Veins (saith he) do run into the Nose not from the inner Parts of the brain, but out of the Cavities of the Mouth and Palate, which are wide and open enough, so as they seem to be the Emissaries of superfluous blood; Even as the Hæmorrhoid Veins, and those which belong to the Neck of the Womb. Wherefore the brain being burthened with blood is not eased, if the blood flow not from the Cavities of *Dura Mater*. But I beleive it flowes out of the brain. And *Galen* and *Arctæus* do write, that the Veins within the Nostrils, beneath the Colander-bone, may be opened by Art.

Sneezing may be said to belong unto the Nostrils, because they being vexed do cause Sneezing. Also Sneezing is referred to Diseases of the Head, and especially to the Epileptic or Falling-Sickness, because it is a momentary Concussion or Convulsion of the brain. So saies *Hippocrates* in the seventh Book of his Aphorismes. It is caused by heating or moistning of what is contained in the Ventricles of the brain.

Chap. 7. Of the Neck.

That Part which is interposed between the Head and the Chest, is termed *The Neck* use *Collum*, and *Neck*: ordained for the Service of the Wind-Pipe and Lungs, and as a Pillar to sustain the Head upon.

It ought to be of an indifferent length, that it may be healthy and useful for the body: because a Neck too short consisting of but six *Vertebraes*, by reason of the shortness of those Vessels which are carryed into the Head, is liable to the Apoplexy or Sleep Diseases; and a Neck too long containing eight *Vertebraes*, does at length bring a Consumption: because the Lungs being shut up in so strait a place do by little and little Wax overhot, and wither away by degrees.

The Neck is made up of divers Parts, which are divided into Containing and Contained. The Containing are common or proper, the contained are manyfold.

There

There are reckoned two common containing Parts, the Scarf-Skin and the Skin. The containing proper Membrane is its Coat viz. The *Musculus Latus*, which seems to be a Propagation of the *Membrana Carnosa*.

The Parts contained are manyfold viz. The Muscles of the ^a Head, of the ^b Neck of the ^c *Os Hyoides*, of the ^d Tongue, of the ^e *Larynx* and the ^f *Pharynx*; which being orderly dissected and taken away there comes in view the ^g *Larynx*, the ^h *Os Hyoides*, the *Pharynx*, the ⁱ Tongue, the ^k *Kernels*, The four Jugulars, the two ^m Carotick Arteries, A Nerve of the ⁿ next Conjugation both descending and Recurrent, the Cervical ^o Veins and ^p Arteries; and the greater number of these Parts, is placed in the foreside of the Neck: in the hinder Part thereof are the ^q *Vertebrae*, and the hinder ^r Muscles ordained to move the Head and Neck.

I wil reserve the Explication of the Muscles to my *Myologia* or *History of Muscles*, where the Reader may look, if he desire to know the muscles of every Part.

^a T. 13. f. 18. T. 14. f. 4. &c. ^b T. 13. f. 18. T. 14. f. 2. 3. 4. ^c T. 13. f. 13. &c. ^d T. 13. f. 14. ^e f. 8. 9. 10. &c. ^f T. 3. f. 2. 3. ^g f. 8. 9. &c. ^h f. 11. 12. A B C. ⁱ f. 15. A. ^k f. 16. 17. &c. ^l T. 12. f. 1. ee. ff. ^m f. 2. aa. ⁿ T. 3. f. 8. ^o T. 12. f. 1. gg. ^p f. 2. dd. ^q T. 13. f. 19. ^r T. 14. f. 2. 3. 4. &c. ^s

But you must diligently observe the *Kernels* placed upon the ^a *Cartilago Thyroides* or Door fashioned Gristle, which are larger in Women than in Men. In this order therefore you shal search for the Parts of the Neck, and separate them if you can one from another, or take them out.

And first of al, the *Musculus Latissimus* being taken away, you shal search diligently for the Nerve of the ^b Sixth pair, placed between the internal jugular Vein and the Carotick Arteries. The ^c *Internal Jugular* has little valves or shutters near the Claves, but the ^d external Jugular has none.

The *Carotick Artery* at its entrance into the Skul, has two very smal thin bones, which hinder and keep back the Arterial blood, when it would flow in too violently.

The *Nerves of the sixth Pair* being both of them tied in a living Dog, he cannot bark having lost his voyce, if one only be tied, he barks but faintly and by halves: which is diligently to be observed.

Then you shal consider the *Os Hyoides*, how it is suspended with strong bands and firmly fastened to the *Apophyses Styloides*; how it sustains the *Larynx*, the *Epiglottis* and the Tongue. For the *Cartilago Thyroides*, is by its Hornes annexed to the *Os Hyoides*.

And therefore the *Os Hyoides* is the Foundation of those Parts, and yet is it moveable in swallowing; and *Rondeletius* saw one taken Speechless as in a Palsie, by reason of the dissolution of the Reluctancy of the Muscles of *Os Hyoides*. Which is a thing to be observed in that bone.

Besides those *Kernels* resting upon the *Cartilago Thyroides*, there are other little ones, placed al along the internal jugular and orderly disposed, into which the brain disburthens it self.

Under the lower Jaw, in the upper and foremer Part of the Neck, are seen two other *Kernels*, which do often swell, and in them the Kings-Evil is bred.

At the Root of the Tongue are the ^a *Tonsillae*, termed *Antiades*; certain *Kernels* so called. Whose pain and swelling are by *Ulpian* termed *Antiagri*.

Al these *Kernels* are diligently to be considered in Fluxions which happen in the Neck, whether they be the *Scrophulae* Kings Evil or *Bronchocele*.

^a T. 13. f. 1. 2. 8. ^b T. 3. f. 8. A B. &c. ^c T. 12. f. 1. ee. ^d f. 1. ff. ^e f. 2. aa. ^f T. 13. f. 11. 12. A B C. ^g T. 15. f. 6. D D. ^h f. 1. 2. 8. A. ⁱ T. 15. f. 16. and 11. ^j

The Medicinal Consideration.

The Pipe of the *Aspera Arteria* is troubled with an hot or cold distemper, with an Humor flowing from the Brain, whence comes *Branchos*, *Raucedo* or Hoarseness.

The Wind-pipe being wounded is curable and may securely be cut, under the *Larynx*, between two Gristles, in a very choaking Squinzie.

whether the wounds of the Wind-pipe are Curable?

May we not experiment this operation in a choaking stoppage and wheezing with rattling in the Wind-pipe, seeing that it may be as safely practised in this case as in the other? that sweet attenuating and cutting Liquors may be taken or forced in, to cut the Flegm and bring it up, if it be possible, and pain, caused by Choughing, hinder not?

^a T. 13. f. 9. and 10. EE. ■

Chap. 15. Of the Oesophagus, or Gullet.

THe *Oesophagus* is the ^a way for the meat to pass into the Stomach. The beginning thereof is termed *Pharynx*, which is moved by the help of Muscles, ^b to thrust or swallow the meat. what the Pharynx is.

It is made up of a proper *Fleshy Membrane*. Woven together with straight and circular Fibres. It has another internal Tunicle which hath its original from the ^c Mouth. Membrane of Oesophagus.

Within the Chest, that it may give way to the *Aorta Artery*, leaving the Backbone, it inclines and is wreathed a little towards the right hand.

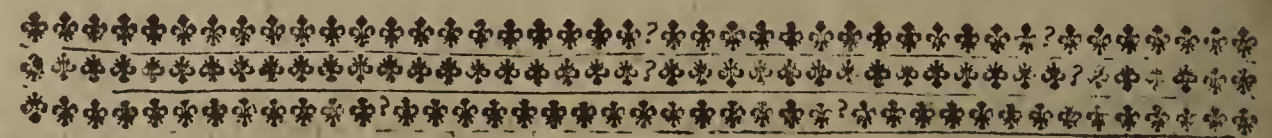
Two *Kernels* support that part which is so turned aside, and stay it on either hand, which being drenched and swelled with some Humor, do bring a great Impediment to the swallowing. Its Kernels.

Sometimes the end of the *Oesophagus* which is joyned to the Stomach, and is in Latin termed ^d *Stomachus*, is obstructed by a Tumor either proceeding from Flegm or Melancholy, which turns at last unto an Ulcer and brings Death. Obstruction of the Oesophagus.

Which Disease is known by the hard descent of solid meat into the Stomach, which sometimes staies, and many times is vomited up again.

^a T. 3. f. 2. EE. f. 3. EF. &c. ■ ^b T. 3. f. 2. and 3. ABC. &c. ■ ^c T. 3. f. 3. D. ■ ^d T. 3. f. 3. H. f. 4. A. ■

The End of the Fourth Book.



THE
FIFTH BOOK
OF THE
ANATOMY
AND
PATHOLOGY
OF
John Riolanus,
THE
KINGS PROFESSOR
OF
PHYSICK.

Chap. 1. *Of the Limbs.*

*The Method
of handling.*



Having gone over and finished the Trunk of the Body, I proceed unto the Limbs, whole Muscles, Veins, Arteries and Nerves with the Lineates of those Parts, I intend to explain, which cannot be done without Anatomical dissection.

But before I proceed to that work: it will do very well to contemplate the external Conformation of the Limbs, and and withal to shew you what Veins are wont to be opened, and in what places Issues may be made.

*Parts of which
the Limbs are
compounded.*

The Limbs are made up of the Scarf-Skin, the Skin, the fatty Membrane, the Flesh of Muscles, Veins, Arteries, Nerves, Bones, Ligaments, Gristles and Kernels. These Parts I shall divide in the Limbs, as I did in the Trunk of the body v. z. Into parts containing and Parts contained.

The Parts containing are the Scarf-Skin, the Skin, the fatty Membrane, and the common Membrane of the Muscles. All the other Parts are contained, being comprehended by these. Touching the Scarf-Skin and the Skin, I shall repeat nothing, because

because they are the same and al a like in al Parts. The *Membrana Adiposa* or fatty Membrane, is spread out in the Arm as far as the Wrist: and in the Leg, from the Groin unto the Ankles.

After that, follows the common Membrane of the Muscles, which comprehends the Muscles in their natural Scituation. In the Thigh the *Fascia Lata* supplies its place.

The Medicinal Consideration.

The Universal Diseases of the Skin are divers distempers, simple, or with Humors conjoyned. If the distemper be with Humor, it makes the Skin rough or swollen, whence springs the Scab, the Mange, the Morphew, Scurfe, Leprosie, Tettors, Itch, Pustles, Blains, Water-bladders, Yellow-Blisters, Warts, Scalds, Moles, Biles, Night-Blains, Ring-worms, Lowse-Evil, Chops, Black and Blewness, Smal-Pocks, Meazles, Whores-Pox and *Elephantiasis* or a Cancerous Tumor, over the whol body.

The Flesh is infested with al kinds of Tumors, Inflammations, Carbuncles, Cholerick Tumors, Phlegmatick Tumors, Melancholick Tumors, Cancers, Watry Tumors, Windy Tumors, Impostums of al sorts, *Steatoma* the Fat impostum, *Atheroma* the Pap impostum, *Meliceris* the Hony impostume, an Ulcer, a wound and a Gangrene.

An Athlerick or Champion-like constitution of body, high fed, and as we say, lusty and full of Beefe, is dangerous. *Hippocrates* shews the Reason in his 1. Book, Aphorisme the 3. and *Celsus* saies, that when a Man becomes Corpulent, he ought to suspect least he be fatted to the slaughter. And in *Hippocrates* his Aphorismes we are told, that fat Men are not so Long-lived as lean Men are, and there are some of cold Constitutions. who have hot Stomachs.

Veins and Arteries have Diseases proper to themselves, the Nerves have their peculiar Diseases, and the Joints have theirs. And the bones are subject to fractures, Dryness, Disjoynting, Rottenness, &c. Which shal be explained when we come to treat of the bones,

Chap. 2. Of the Superior Limbs.

The Limbs both Superior and inferior are divided into three principal Parts: the Arm into ^a *Brachium* from the Shoulder to the Elbow, ^b *Cubitus* from the Elbow to the Hand, and the ^c Hand: The Leg into the ^d Thigh the ^e Shank, and the ^f Foot. And forasmuch as the whol Arm hangs upon the ^g Shoulder bone, as the whol Leg upon the ^h Huckle bone, and those bones are not reckoned to appertain unto the Back-bone, the best way is to begin our description of the Limbs from them, viz. Of the Arm from the Shoulder-blade, and of the Leg from the Huckle-bone.

Of the Shoulder-blade and the Arm from the Shoulder to the Elbow.

The Shoulder-blade ⁱ Joyned to the ^k Arm, makes a Joynt: in the bending of which Joynt beneath, Kernels are placed, which are counted to be the Close stools of the Chest or Heart, as the *Parotides* or Kernels behind the Ears, are of the brain, into which those Parts do empty their Excrements. The place of these Kernels is called the Arm-Pit.

These Kernels do frequently Swel, Impostumate, are infected with the Kings-Evil, and subject to Buboës, yea such as accompany the Whores-Pox, as in the Groin.

This Joynt is liable to be disjoynted, but it is more often vexed with the Gout, Rheumatisme, and other Fluxions. The strong smel of the Arm-Holes proceeds from these Kernels. Upon which Martial has wittily and neatly played in one of his Epigrams.

Lædit te quedam mala fabula, qua tibi fertur
 Valle sub alarum trux habitare caper:
 Hunc metuunt omnes, neque mirum, nam mala
 valde est
 Bestia.

That is,

An ill Report your Credit (Sir.) does wound,
 How that a stinking Goat has dwelling found
 Within your hollow Arm-Pits shady Grove,
 A beast which all Men fear, and none do love;
 And good Cause why &c.

Of the Cubit or part of the Arm from the Elbow to the Hand.

The Articulation of the Brachium with the Cubit, is more hardly disjoynted; The Diseases of the Joynts of these Parts. admits Fluxions which do there breed divers Tumors hard to cure. In which case, unless diligent care be taken, the very bones are altered and the Cubit is made crooked, and such as are on that manner crook't, are by Hippocrates termed Galligones.

If such a crookedness be caused by a retraction of the Muscles, it is more easily cured, than if it come from a repletion of the Cavities by a thick, clammy, condensed and dried Humor.

The Articulation of the Cubit to the Wrist is subject to many Diseases, the Gout, the Rheumatisme, the Tumor Ganglion which possesses the tendons of the Muscles; Flegmatick Knobs and other Tumors.

Of the Hand.

Diseases of the Hand.

The Hand is divided into the ^c Wrist the ^d After-Wrist and the ^e Fingers. To these Parts the Diseases lately named are common. A Disease in number is here usual in Children from the Womb, viz. A Sixth Finger growing to the Thumb or little Finger. It is easily taken away, by the Incision Knife.

Of the Nails

Diseases of the Nails.

The Fingers are terminated and closed up by the Nails, which are liable to divers Diseases, in Figure, in Magnitude, while they grow thick, wrinkled, unequal, rough, hooked as in leprous persons; they are also Cleft; and fall off in the time of Sicknes and afterwards breed again. The Color of the Nails is changed in time of Sicknes. Also there is a sore Disease of the Nails termed a White-Loase or Felon.

A Wheyish very sharp Humor is bred under the Naile near the bone, which causes most bitter and intollerable pains, and brings an Inflammation first of the Hand, and after of the Arm also, unless the Humor be let out, by cutting the pappy flesh of the Finger to the very bone.

Of the Pappy Ends of the Fingers.

The Pappy Ends of the Fingers are often corrupted, and putrifie, and sometimes the last Joynt of a Finger must of necessity be cut off, by reason of a sphacelation of the bone.

Paronychia Græcorum, viz. Opening of the Skin at the corners of the Nails and Issuing of blood thereat, is a sleight Disease, which does not affect the tendons and Nerves of the Fingers Ends, as that Panaritium Arabum, a Disease of this Part described by the Arabian Physitians.

The

The Ancient Phylosophers, and Physitians, were wont to Divine, and tel Fortunes, by the Nails of Mens Fingers: touching which kind of Divination, *Camilus Baldus* has lately written.

^aT. 21. f. 1. C. ^bf. 1. D E. ^cf. 1. F G H I. ^df. 1. K. ^ef. 1. M N. ^ff. 1. O P Q. ^gf. 1. A. ^hf. 4. A. ⁱf. 1. A. ^kf. 1. C. ^aT. 21. f. 1. C. ^bf. 1. D E. ^cf. 1. F. ^df. 1. G H. ^ef. 1. I.

Chap. 3. Of the Inferior Limbs.

The Inferior Limbs are commonly divided into three Parts; The Thighs, the Shank, and the Foot. The *Os Ilium* is joyned to the Thigh, and from thence we are to take measure of the length of the Leg. In the bending of the *Os Ilii*, and the Thigh, are placed many Kernels, above and beneath; in which divers Buboes arise, both Pestilential, Venereal, and springing from common Causes: of which we have spoken in our Chapter of the *Peritoneum*.

These inferior Limbs are liable to the same Diseases with the superior, which I wil not repeat. Proud Flesh is often bred in the hinder parts by contusion of the Thighs, occasioned by long and hard sitting, or riding. *Fernelius* does elegantly explain the material Cause hereof.

It is not caused by afflux of Humors, but only by the nourishment of the Part, which being ulcerated within or without, if it be not stopped, it is by continual access of Nutriment spread abroad, and swelled, and produces oftentimes as it were certain Pipes of Veins and Arteries; by which it is nourished. So, when the Skin remaining whol, the Flesh underneath is bruised and torn, a mighty Swelling does arise by little and little, without any pain, but furnished with exquisite sence, and Natural Heat.

In the Joynt of the Thigh, about the Cavity of the Huckle bone, is bred the Gout called *Sciatica*. If the Humor flow into the *Aceabulum*, and cause the Head of the Thigh-bone to slip out of its place, it breeds a Disease in Scituation hard to cure, and which at last causes the Patient to halt.

If a very sharp putrid Humor does corrode, and bring corruption into the Joynt, it produces a Disease called *Phthisis Coxaria*, the Hip-Consumption, which makes an end of the Patient by degrees. If an Humor flow into that part where the great Nerve arises, which creeps up and down the hind parts of the Leg, *Notha Ischiar*, or a *Bastard Sciatica* is produced.

Swellings of the Knee, either springing from a Flegmatick Humor, or from Inflammation, are oftentimes very dangerous, or long-lasting; and at last do hasten the Patients Death.

The Foot is divided into the ^aTarsus, ^bMetatarsus, and the ^cToes. The first Bone of the Tarsus called ^dPterna, is subject to a Disease springing from Cold or Fluxion, which is called *Pernio*, a Kibe. And because this Bone receives a very thick Tendon, if it be bruised and wounded, it causes inevitable death, by the very Convulsions thereby raised.

The Toes of the Feet, by compression, and straitness of Shoes or Boots, have painful Corns breeding upon them, the unwary extirpation whereof has sometimes brought a Gangrene into the Part.

^aT. 21. f. 1. O. ^bf. 1. P. ^cf. 1. Q. ^df. 5. B.

The whol Leg from the bending of the Groyn unto the Toes, is sometimes exceedingly swollen with an hard, and ill-favored Tumor, which is called *Elephantiasis Arabum*: The Arabian Physitians, Elephants Leg, because it makes the Leg of the Patient resemble that of an Elephant.

But the Shank and Foot are chiefly liable to defluxions which are caused either in such as are newly recovered out of ticknets, by the Humors falling down into those parts; or primarily by the evil Disposition of the said parts.

The

The principal matter of these Tumors, is Wind or Water, or a clammy Flegmatick Humor, which produces the swelling called *Oedema*.

Sometimes the Toes of the Feet, as well as the Fingers of the Hand, are deficient or superfluous in their Number. There is a little knob grows sometimes under the little Toe called *Gemursa*, because it makes the Patient groan.

Ill shape

Diseases consisting in the Evil-shaping of the Shank and Foot are frequent. Hence arose those nick Names *Varus*, one that has crooked Legs bending inward; *Valgus*, one that has Legs bending outward; *Compernis*, one narrow between the Knees; *Scauripeda*, one that has hunching Ankles, that interfere and hinder his going; *Pansus*, one that has a broad or Splay foot; *Atta*, he that treads only on the fore part of his Feet, as it were on Tip Toes; *Plantus*, he that is Splay-footed or Broad-footed, all which Infirmities are seen in grown Persons and in Children.

Some are borne with their Legs contracted, others become so by ill Swadling in the time of their Infancy, and by untoward Carriage in their Nurses Arms. Sometimes one foot is longer than the other which Causes halting.

*Stink
Palsie*

Sometimes the Feet do Stink intollerably, by reason of their much heat and Sweat; which must be helped. Oftentimes there happens a *Palsie* of the lower Limbs, by reason of a Defluxion of Humors out of the Mesentery, into the Lumbar Nerves. Many times a bastard *Sciatica* does possess the whole Thigh as low as to the Ankle-bone, even as far as that most thick Nerve does reach, which comes from the Os Sacrum. Pains of the Knees are extream bitter and make stout Men cry out. Because of the consent the Knees had with the Veins in the Mothers Womb. And *Pliny* saies that a Mans life lies in his very Knees.

Knees pains.

*wounds of the
Ankle.*

Fluxions of Rheum into this Joynt are long lasting, dangerous and hard to Cure, in the Judgment of *Pardus*, which daily experience does confirm. And a blow or wound in the Ankle, that same great Tendon being bruised or wounded, do bring Death, not without great Convulsions, so saies *Hippocrates*.

Chap. 4. *In what places Issues are commonly made.*

Places of Issues.

*in
The Crown of
the Head.*

*The Hind part
of the Head.*

*Fore part of
the Head.*

*The Neck
The Arm
The Brest*

The Thigh

The Leg

Now I will shew you in what places Issues are to be made to purge out Wheyish Humors, which flow either through the Vessels or between the Skin. I will begin at the Head.

And first of all an Issue may be made where the sagittary and coronal Sutures meet. You may find the place by applying your Wrist to the Nose of the Patient, and observing how far you can reach upon his head with your middle Finger, for there the Issue must be made.

Also in the hollow part of the *Occiput* or hind part of the Head. But if you find no fitting Cavity there, you may apply your Caustick on either side of the Additions of the *Sutura Lambdoides*.

Likewise in the hollow behind the Ears, when the Eyes or Ears are Diseased.

Sometimes on either side of the Neck, as far as the third or fourth *Vertebra*.

In the middle of the Arm between the Muscles *Deltoides* and *Biceps*.

In the Brest, two or three may be made according to the Longitude thereof, in Diseases of the Chest and Lungs.

At the bending of the Buttocks, at the Ends of the Muscles cald *Gloutii*, where the Thigh is perceived to move upon the Joynt, an Issue may be made, in a perfect *Sciatica* when the Humor possesses the Cavity of the Joynt.

Issues are made within side the Thigh, two Fingers above the Knee; also on the inside of the Leg, two Fingers beneath the Ham.

Sometimes to turn away Fluxions into the Thigh, Issues are made upon the Loins, near the Back-bone, on each side the said bone.

Chap. 5. Of Veins usually opened.

I Proceed unto such Veins of the whole body as are usually opened. Veins which now adays are opened in the Head, are in the Forehead, the hinder part of the Head, and in the Temples.

The Forehead Vein is termed a *Præparata* or the ready Vein, because it is evident, and there is no need to Shave the Hair to come at it, as must be done in the Vein behind the Head, which is termed *Vena Puppi*, the Aftership-Vein.

The ancients did open the Veins behind the Ears, but that operation is now out of use: *Hippocrates* saies the cutting of those Veins made the Scythians barren; perhaps he meant the Arteries in those Parts. The manner of opening these Veins *Albucasis* does teach us in his 2. Book Chap. 97.

Neither is it unprofitable to open the Veins of the Head, by reason of the external Veins, which through the holes of the Skull have communion with the Meninges.

I know *Hieronimus Fabricius ab Aqua Pendente* disallows the opening of those Veins, because oftentimes they do not appear. But if the Head be rubbed, and the Hair shaved off and then again rubbed, they will be more evident, provided you throttle the Neck a little with a Towel or Napkin.

The temporal Vein is also cut as is the Artery, in great and continual pains of the Head.

The Ancients did open the inner Veins of the Nose, as appears out of *Hippocrates* in divers places, and from *Galen* his 6. Book of Epidemics. The later Greek writers, *Paulus Aegineta* and *Aretæus*, mention the opening of inner Veins of the Nose: and *Aretæus* himself, declares the Instruments which the Ancients used, to provoke those Veins to bleed. But if the blood, according to the Opinion of *Fernelius*, do flow from the Veins of the Face, which creep into the inner Parts of the Nostrils; the Head being oppressed with plenty of blood, cannot be eased, because that same Irritation and opening of the Veins, ought to be performed near the Colander bone, that the Longitudinal passage creeping unto the Nostrils may be opened. therefore I conceive those Parts are frequently to be fomented with Luke-warm Water, before we use those Instruments propounded by *Aretæus*.

The manner of opening those Veins propounded by *Albucasis*, may be admitted, but it does not penetrate to the inmost Part of the Nostrils, as far as the Colander bone.

The Veins under the Tongue termed *Ranulares* are more frequently opened with good success, in Diseases of the Throat and Head. Only *Aurelianus* against *Dioscorides* has disallowed that Practice, alledging that it fills the Head, and the blood cannot be stoppt. Lib. 1. Acut. c. 12.

True it is that in some the blood has Issued so plentifully, that it could very hardly be stoppt, as was observed in a Capuchin Friar, Father *Joseph le Clerc*, the great Politician and familiar friend of the Cardinal *Richelieu*; as *Simon Pim-pernel* a most expert Surgeon of *Paris*, himself told me, he having opened the said Veins, in the Friar aforesaid.

In the Neck the external Jugular is opened. *Trallianus* in Cure of the Squinzie opened the same with good success Lib. 4. Chap. 1. And *Soranus Ephesus*, in his Introduction Chap. 12. Commends the opening of this Vein. In like manner *Acturius* commends this Practice in dangerous Diseases of the Head. *Cesalpinus* Lib. 2. Quest: Medic. Chap. 12. Commands the opening of this Vein in a Squinzy, because the Jugular Veins are more filled, than the shut cover and Mouth of the Larynx.

Prosper Alpinus in his 2. Book of the Egyptian manner of healing Diseases Chap. 9. Writes that this is a common Remedy in that Contrey.

T. I. f. 1. H. T. I. f. 1. I. T. I. R.

Jacobus

The Veins
which are wont
to be opened.

in
The Fore head
Hind part of
the Head.

In the Temples

In the Nose

In the Mouth

In the Neck.

Jacobus Corpus in his *Anatomical Introductions*, shews the way to open those Veins. Read *Paulus Magnus* Lib. de *Pblebotomia* printed in the Italian Tongue. And *Rondeletius* in his *Methodus Medendi*; *Ludovicus Mercatus* Chap. 13. Method; Medend. And *Albucasis* Lib. 2. Chap. 97.

In the Back

Rondeletius tells us of a Vein in the Back Lib. 1. *Methodi Melendi*. Chap. 37. Which he saies is to be found, in the first *Vertebra* of the Back; it is seen elevated on the top of the *Vertebrae*, creeping down the back, as far as *Os Sacrum*. It seems to flow from the brain according to the Longitude of the spinal Marrow. He lets us know that this Vein is profitably opened, in the *Tetanus* and Falling-Sickness, and if it be not so visible as to be opened, in that place must Cupping-Glasses be fastened with Scarification.

Ludovicus Mercatus in Lib. 1. *Practica* Cap. 19. Commends this Remedy against the Convulsion. *Hippocrates* in his *Book de Visu*, burnes and pricks the Veins of the back: which Remedy is propounded by *Alexander Benedictus* Lib. 1. de *Morbis Curandis*, c. 5. And *Gattinaria* advises to open the same in his *Comment upon the 9. Book of Rhasis*.

In the Arm

In the Arm three Veins are opened, the *Cephalick* or *Head Vein* accompanied by an *a* Artery without any Nerve; and therefore it is opened without danger. The *Basilica* and *Mediana* are opened, but the *b* *Basilica* must be opened with prudent waryness, by reason of an Artery near the same and the Tendon of *Musculus Biceps*, which lies beneath it: neither is the *c* *Mediana* void of the like danger.

In the Hand between the Ring Finger and the little Finger the *d* *Salvatella* is opened, the opening thereof many account superstition: howbeit *Hippocrates* opened the Veins of the Hands: and this Remedy has not been rejected by learned Physitians, especially in long lasting Sicknesses, and in the Quartan Ague at the Conjunction of the Sun and Moon: which I have known to have succeeded happily both to other Physitians, and to my self, in old Quartans, after the use of divers Medicaments.

It is not our Custom to open the Veins in the lower part of the Thigh above the Knee: yet *Lazarus Sotus* saies that they are opened in Portugal in his 1. *Book of Animadversions*, Chap. 4. Sect. 61. To stop gouty Defluxions into the Legs, and to diminish the deformity of the *Varices* or black swollen Veins of those Parts, the Ancients were wont to open them. And *Platerus* commends this Remedy to diminish the *Varices*. Which may be confirmed out of *Galen* Lib. 2. *Method: ad Glauconem*.

In the Foot

In the foot is opened the *a* *Saphena*, which is above the *Malleolus internus* or inner Ankle bone; or the continuation thereof in *Tarso*, or the swelling side of the Foot between the Heel and the great Toe.

Sometimes the *b* *Ischiadica Vena* or *Sciatica* Vein, is opened, which is Scituate in the external Ankle. But this Vein ought not to be opened without very great heed to the place where the Orifice is made, because of an Artery near, and Tendons very near the same.

'Twas usual with the Ancients to open the *c* *Ham Vein*, which is now a daies seldom performed, and quite out of use: nevertheless the opening thereof would be as beneficial as is the opening of the Arm Veins.

Whether the
Foot Veins may
be opened and
how?

It might be conveniently opened if the Leg be put into a Vessel of hot Water above the Knee, and rubbed, as is usual in bleeding at the Arm; also a double Ligature may be used, one above and the other below the Knee. It is easily found and safely opened, below the hollow of the Ham, at the beginning of the *Musculi Gemielli*: and a sick Woman as she lies in her bed, may as conveniently present her Leg as the Arm, being covered with the sheet or other fitting covering.

Though the *Sciatica* Vein and the *Saphena* are branches of the Crural Vein; yet, because the *Sciatica* Vein does answer the *Basilica*, as the *Saphena* does the *Cephalica* of the Arm; certain it is, blood is drawn by a more direct way from the

The Medicinal Consideration.

The Neck is subject to Similar Diseases arising from distemper, and to Diseases Organical, consisting in bad Conformation: if it be too long, or too short, or the *Vertebrae* thereof be out of Joint, especially the second; in Magnitude, if it be swelled, as in the *Bronchocele*, *Kings-Evil* and *Squinsie*.

Similar Diseases of the Neck.
The Organical Diseases.
as
Bronchocele

Bronchocele is a Swelling in the Neck, near the *Larynx*, arising from an humor collected in that place, or from the Kernel of the *Cartilago Thyroides* being longer than ordinary and producing superfluous flesh; or it is an *Impostum* proceeding from the Tumor *Atheroma* or *Steatoma*, or it is a *Dropsie*. *Bronchocele* does not proceed, as many have imagined, from immoderate Clamors and Cryings out, or by drinking of melted Snow, as the fashion is among the Inhabitants of the Alps or other high Mountaines; but from thick and clammy *Flegm*, which slides thither by little and little out of the Head and the external Parts thereof, down behind the Eares. Which is the Judgment of *Fernelius*.

It may be questioned, whether the matter be contained between the *Musculus latus* and the Skin, or whether it lie all concealed under the *Musculus Latus*. For if the matter be collected there, it cannot be drawn out, because it is crept in between the spaces of the Muscles.

If it lie outward to the sight, it may be rooted out and cured. It is wont to begin with a wind, which distends and separates the Skin from the *Membrana Carnosa*: or the *Musculus Latus* it self, is separated from the Parts which lie beneath the same.

Into the which space the matter flows by degrees, which differs according to the various temperament and Constitution of the Patients.

It grows by little and little, and receives nourishment, not by the Veins, but by certain little Pipes which Nature creates.

Bronchocele differs very much from the *Kings-Evil-Swellings*, which rise under the Jaw and in the Neck, of a rounder shape, distinct one from another, or clustered together. They spring from a *Flegmatick* clammy matter, which drenches the Kernels and makes them swell; and therefore look where there are Kernels, there the swellings arise.

Kings-Evil

Scirrhus Tumors have in them somewhat of the Nature of the *Kings-Evil-Swellings*, which makes them suspected. They happen under the Jaws, in the Groins, behind the Ears, and in all Parts of the Body where there are *Glandules* or Kernels. And sometimes in certain places of the Body, a portion of Fat grows hard and makes a *Scirrhus* Tumor and sometime the *Kings-Evil*.

The Tumor *Gongroni* is mustered among the external swellings of the Neck. It is caused by an Humor, not so thick as that in the *Kings-Evil*, or *Bronchocele*.

Gongrone.

Angina the squinsie, is a Tumor of the Neck either internal or external: or an internal or external inflammation of the Neck.

Squinsie

The external is properly called *Synanche*, the Internal is termed *Cynanche*. *Galen* conceives that this distinction of Names is vain and of no use in Practice. But I account the same necessary. For although general Medicines do serve for both, yet in *Cynanche* where the Patient can neither fetch breath nor speak, the danger is greater: and therefore Medicines are to be speeded with all hast possible: yea and the Wind-Pipe must be opened ere twenty four hours are past, that the Patient may by that means receive breath, til such time as the upper Part of the *Larynx* be unstopped. For in that kind of *Squinsie*, where no outward swelling appears, the *Larynx* alone is inflamed and obstructed. In other *Squinsies* the Circumjacent Muscles of other Parts are affected: In the *Cynanche*, the Fluxion is in the *Arytenoid* and the Glottis, and in other *Musculous Carnosities* of the *Larynx*, by which means the passage of the *Larynx* is stopped, and death follows unavoidably.

for though there is some little passage left for Liquors; yet no man can live without fetching his breath.

A Leek thrust into the Throat, with some sharp biting Powder sprinkled upon it may do good, as also some strong drawing Medicine or a Vesicatory applied to the *Larynx*, and Scarifications made here and there about the *Larynx*. Touching the Squinzie, read *Hippocrates* in the 27. and 34. Aphorismes of his sixth Book. In the third Book of his Prognosticks, And in the 49. Aphorisme of his seventh Book.

Chap. 8. Of the Teeth and Gums.

I Return now unto the inner Parts of the Mouth which are there contained, and may be seen with the Eyes, such as are the Teeth, Gums, Palate, *Uvula* and Tongue, of which in order.

Use of the
Teeth.

I wil begin with the *Teeth*, the Instruments of Chewing and of speaking; for those that are Tooth-les cannot wel chew and grind their Meat, neither can they pronource their words clear and plain as they ought to do.

There is a twofold consideration of the Teeth; as they are in Infants, til they are two or three years Old, and as they are in persons of riper years.

Condition of
the Teeth in
Infants.

In Infants they break out by Course, first the Cutters, then the Dog-Teeth, after them the Grinders, and they have but a wenty til they are three years Old, at which time the rest break forth.

These first Teeth are called *Dentes Lactei*, the milk Teeth, which have under them another branch, which wil shoot forth another Tooth, if the first be plucked out, or come out of it self.

There are two seasons observed in which Children are most tormented with Tooth-breeding: the one is when they first sprout within the Gum, the other is when they break cut of the Gum. And under the Term of Tooth-breeding *Hippocrates* does in a manner comprehend al Childrens Diseases, because Children are troubled with many Diseases upon that account, springing from the pain of Teeth-breeding, and bringing them to their Graves.

In grown Per-
sons.

In Persons grown up the Teeth are distributed into two ranks or a rows, according to the two Jaws in which they are fixed. In each Jaw are reckoned fifteen or sixteen Teeth, and they are of three sorts. The first four placed in the forepart of the Jaw, are called *Cutters*: next them on either side, are the two *Dog-Teeth*, and after them on each side five *Grinders*. They are immovably fastened in their Holes called *Alveoli*, by that kind of Articulation which is termed *Gomphosis*.

They are bound and fastened both by their proper *Ligaments*, and by the *Gums*.

Their Vessels.

They recive Nerves, Veins and Arteries within their Roots, which are hollow, and therefore they are pained more than any other of the bones. The external and bare Part of the Tooth, is termed its *Basis*, the internal which is covered, is called the *Root*, which is double or triple.

^a T. 14. f. 3. ^b T. 15. f. 6. m. ^c T. 15. f. 6. n. ^d T. 15. f. 6. o. o. o. s.

The Medicinal Consideration.

Diseases of
the Teeth in
Infants.

Tooth-Sicknesses of Infants, have two times in which they are wont to torment and kil. The first is when the Tooth first sprouts within the Gum, which is called *Odaxismos*, which causes the Gums to Swel and be inflamed, brings Feavers, continual Vomiting and Loosness: the other is the time of the breaking forth of the Tooth, which is called *Odontophua*, and then the poor Infants are most of al vexed and tormented with pains.

The teeth of grown Persons are troubled with divers Diseases, as *Distempers*, *Dryness* through Age, and *Loosness*; with Organick Diseases in *Number Deficient*, when they fall out; or in *Number exceeding*, when there are two or three rows of Teeth: or when there is but one Bone, in the place of so many Teeth.

In *Magnitude* exceeding or deficient, as when there be long gag Teeth, that go out of their Rank, or when the Teeth are too little and worn away.

In *Situation*, when they stand not close together, or when the lower Teeth are not just against the upper, or when the upper Teeth fall within the lower, or when Teeth grow in the *Palate* of the Mouth.

Diseases common are, when the Teeth Scale and moulder away with rottenness, or when they are broken.

Symptomes of the Teeth, are the hurting of the proper and peculiar feeling of the Teeth, which is called *Hemodia*, *Setting of the Teeth on Edge*; or the hurting of the common feeling of the Teeth, which causes the *Tooth Ach*, which is termed *Odontalgia* or *Odontagra* for the likeness it has to pains of the Gout. Pain of the Teeth is reckoned among the greatest torments which are in the world, although a Tooth be so small a Part. *Celsus* Book the sixth Chap. 9.

Simple Affections of the Teeth are *Blackness*, *Rustyness* and a clammy gluishness (which *Hippocrates* counts the sign of a strong Feaver) also a stony Crust which grows upon them.

Symptomes in the Irregularity of things voided, are, A *Stinking* of the Teeth, an excrescence and *Worms*, which are bred within the Cavities of the Teeth, or a flux of blood immoderately flowing, after the drawing of a Tooth, which is sometimes a cause of Death. See *Duretus* in his Comments upon the *Coicks* of *Hippocrates*, where he explains what is the grinding of the Teeth in Diseases.

Dryness of the Teeth in Sick people, foretels a Convulsion or Madness.

It is worth the enquiry. Whether into the place of a Tooth drawn out, another may be thrust in at the same moment, and fixed in the Room thereof, so as to stick fast and be cloathed with the Gums flesh, and to abide and serve to chew the Meat with the other Teeth?

He that shall consider that the Teeth have Life, do receive Veins, Arteries and Nerves; do feel, are pained; and firmly tied and fastened with certain bands into the Gums: will never say that a strang Tooth, thrust into the place of one pluckt out, can be made so like to the other Teeth, as to perform the same Office with them and stick there as long as they shall do. Yet some Physicians in favour of a Norman Tooth-drawer, would persuade Men that it is possible to substitute such a Tooth, and they have upbraided me with Incredulity and Ignorance, because I am not of their mind.

You are to consider the holes in the upper and lower Jaw-bone, through which are drawn the Nerves Veins and Arteries, which are inserted into the Roots of the Teeth.

In the upper Jaw there creeps an Artery which running towards the Eare, is there burnt, or seared up, and to that place and upon the Temples, an astringent plaster is laid to stop the Veins by which the Flux of Rheum does come.

There creeps an Artery in the Lower Jaw near the Corner, which is to be seared where it beates, or topicks are to be laid thereupon, to ease the Tooth-Ach of the lower Jaw.

Sometimes a bony Fungus or Spungy substance grows out of the hole of a Tooth, and comes to be so big as to fill the Patients Mouth, and at length to choak him, if prevention be not used, by cutting off the said excrescence and burning the Root thereof.

You shall observe that the brain hurts the Teeth by Distillation of Rheum, the Stomach hurts them by Fumigation or raising fumes and Steams which annoy them: and that the Lungs likewise do in some Measure damage the Teeth.

That there is a Regeneration of the Teeth, and that Teeth grow out in every Age of Man, is most certain: yet must we not rely upon this Regeneration of Teeth,

In grown persons.

Symptomes of the Teeth are.

Setting on edge

Tooth-ach.

Stinking.
Excrescence.
Worms.
Bleeding.

whether a Tooth may be fastened in the place of one drawn out?

How the Spungy excrescence is taken out of the Tooth-hole.

whether Teeth do breed in all Ages?

so as certainly to make account thereof, and expect it after seven years are over.

To *Clenſe* the *Teeth* you ſhal find an *Admirable Water*, in the 96. *Counſel* of *Fernelius*

Chap. 9. Of the Gums.

The natural
Constitution of
the Gums.

Preternatural.

Parulis.

Epulis.

Cancer.

THE Gums are certain parcels of Flesh folded about the Teeth, which cover the holes of the Teeth within and without: but without they are wider and more swelling. When this Flesh of the Gums grows *Proud* and covers the Teeth more than it should, it causes pain and hinders Chewing; also the *Loöſneſſ* of the ſaid Flesh is troublesome, becauſe it makes the Teeth to become looſe.

Inflamation of the Gums is called *Parulis*: if the Flesh grow from an Ulcer, its termed *Epulis*. Sometimes the Gums are *Cancerated*, and ſometimes they bleed immoderately.

The Gums are Eaten up by Ulcers called *Aphthæ*: in the Scurvy (which the Old Phyſicians called *Stomachache* and *Oſcedo*) the Ulcers of the Gums are Malignant.

Aphthæ.

Sometimes theſe *Aphthæ* or Ulcers of the Gums are ſo Malignant, that they eate into the Tongue, *Uvula*, and *Tonſillæ*, without ſuſpition of the Venereal Pox. ſuch are deſcribed by *Aretæus*, and ſuch appear in that ſtrangling Spaniſh Diſeaſe, which the Spaniards cal *Garotillo*, and which is common to the inhabitants of Naples (who cal it *Ulcus Syriacum* *Faucium*) perhaps by reaſon of their Commerce with the Spaniards, who are much ſubject to the Kings-Evil: and therefore the Malignant Humor of the Kings-Evil does Produce ſuch Symptoms in the Mouth and Jaws.

Chap. 10. Of the Palate.

The ſtructure
of the Palate.

Its Rottenneſſ.

THE Palate is the ^a Vaulted Rooſe of the Mouth, which is a very thin bone, cloathed with a ^b Nervous Skin, which is wrinkled, by reaſon of the *Creveſſes* which are ingraven in the bone: and therefore it ſticks very hard to the bone, which has no *Perioſtium*.

This moſt tender bone does many times become rotten in the Whores-Pocks, the Palate being boared through (if care be not taken in time) whether the infection be lodged in the Mouth, or within the Noſe: which Hole ſo boared does much hinder the Patient in chewing of Meat and in ſpeaking unleſſ it be ſtopped with a plate, Cotton, or Sponge.

Chap. 11. Of the Uvula and Isthmus.

The Uſe of
the Uvula.

AT the inner part or further part of the ^c Palate hangs the ^d *Gargareon* or *Uvula*, a Fleſhy Particle, which is given to mankind to help his ſpeech, and to ſome birds which imitate the ſpeech of Man: it hangs therefore at the fartheſt end of the Palate, to help our ſpeech, being that to the voyce, which the Quil is to the Muſical Inſtrument, whoſe ſtrings are ſtruck therewith. It is therefore called the *Striker* by *Paulus Aegineta* in the 51. Chapter of his ſixt Book.

It hinders liquid things from running back into the Noſtrils, and it purifies the Air which enters into the Wind-Pipe. Therefore ſuch as have no *Uvula*, are hoarſe in ſpeaking, part of what they drink runs into their Noſe, and becauſe of the impurity of the Air which they draw into their Lungs, they fal into a Conſumption.

Its Muſcles.

It has ^a Muſcles for motion, though it be moved very obſcurly or rather ſuſpend-
ed

ed in *Æquilibrio*. Of these Muscles you may read in my History of the Muscles. Lib. 5.

To this Particle are adjoynd certain *Lateral Ligaments*, which being widened and spread forth by a Defluxion of rheum, they resemble the wings of Bats or Flitter-Mice, and are very troublesome to the Patient. Naturally they ought to be dry, and drawn back toward the Palate bone: they are two, and do include the ^b Kernels termed *Tonsille*.

Ligaments.

The Medicinal Consideration.

This Part, *viz.* The *Uvula* or *Gargareon* is Inflamed Swelled, Lengthened and grows *Lank*. When it is inflamed it represents a Grape, and is termed *Staphyle*; if it represent a Pillar, tis called *Columella* and *Chion*; if it grow loose and flap by reason of the Rheum, tis called *Chalasis* *Gargareonis*; and then it is contracted and drawn back, by sprinkling salt or Peper upon it, whereby the moisture thereof is dried up.

Its Diseases.

Staphyle.

Columella.

Chalasis.

If it hang down too much, part of it is cut away; if the lateral Membranes are relaxed it is called *Imantis* by Aretæus; who elegantly describes the Relaxation of those Ligaments in his first *Book de Causis Acutorum*, Chap. 8. Of the *Gargareon* read *Hippocrates*, in his third *Progn.* sent. 31.

Imantis.

^a T. 15. f. 5. L. L. &c. ^b T. 13. f. 15. D. ^c T. 13. f. 15. D. ^d T. 13. f. 15. A.

^a T. 13. f. 15. B. B. C. C. &c. ^b T. 13. f. 17. and 18.

Of the Isthmus.

Isthmus is a place or space between the *Larynx* and *Pharynx*, seated in the Throat, like a Neck of land between two Seas, which is an *Isthmus*.

Isthmus defined.

The Kernels there placed are called ^a *Antiades* and *Paristhmia*. The swelling of those Kernels is called by the same names by which the *Tonsillæ* are called when they are inflamed. Sometimes they swell and grow to such a greatness, that they descend into the Throat like two Apples and hinder the Patient from swallowing and fetching breath.

Diseases of the Tonsillæ.

They are often inflamed and Impostumated, and then they must be pricked deep in with a lancet, to let out the blood or quitor, otherwise they choak the Patient. Sometimes they are infected with Cancerous Tumors, which are incurable.

Chap. 12. Of the Tongue.

THE Tongue, which is the Instrument of tasting, speaking and swallowing; is made up of a ^b Fleshy and Spungy substance, compassed about with a thin Membrane. Although it seem one, yet is it divided into two Parts, which are so separated, although closely connexed; that one side may have the Palsie and the other be free, and the one side may be discoloured and the other not.

The Tongue's Substance. Number.

It is placed in the Mouth and throat, born up by the Basis of the ^c *Os Hyoides*, and tied with a strong band. It was very conveniently thus seated, that it might discover the Diseases which lie hid in the three Cavities of the Body *viz.* The belly, Chest and Head. For it is soaked and tainted with the moist and fuliginous Excrements of those Parts, and has the Color of that Humor which bears most sway in the Body.

Situation.

And therefore because it is the Instrument of Taste, of speech and of the Mind, it was requisite that it should correspond and communicate with those principal Bowels: and therefore as the Urin is in all Diseases looked upon and examined, so ought the Tongue to be diligently considered. *Hippocrates* Lib. 6. *Epidem.* Sect. 3.

Text 14.

The

The Tongue shews what the Urin is: which Galen has confirmed in his Commentary upon that place.

Magnitude.

The Magnitude of the Tongue is to be considered: for naturally it ought to be as long as a mans middle Finger, but hardly so thick as the said Finger, and not broader than the breath of two Fingers. Such is the natural greatness of the Tongue, that it may be fit to speak with, otherwise a thick, over-long and over-broad Tongue, doth much hinder a mans Speaking.

Proglossis

The^a pointed end of the Tongue, which smites against the Teeth, is termed *Proglossis*: the broad end which lies hid in the Throat, is called *Basis Linguae*, the bottome of the Tongue. That it may not run out to far, or wander from its bounds, it is retained by a band under neath, which is called *Frænum Linguae*, the bridle of the Tongue.

Frænum

Its Vessels.

Kernels.

It has Veins from the Jugular, Arteries from the Carotick. The Veins under the Tongue are called *Hypoglossides* or *Ranulae*: and two Kernels placed there are likewise termed *Ranulares*, in which, grown round and hard, the foundation of the *Elephantiasis*, a kind of Leprosie, is bred, as appears by the swelling of the Lips, Pushe of the Face, and thicknes of the Tongue.

Muscles

It has^c Nerves for tasting and motion. For though it be of it self Voluble in speaking, yet for the more strong motions of chewing, swallowing and spitting, it stands in need of^d Muscles, of which you may read in my *History of Muscles* Lib. 5.

^a T. 13. f. 16. and 17. ^b T. 13. f. 14. A. &c. ^c T. 13. f. 11. and 12. A.

^a T. 13. f. 14. A. ^b T. 13. f. 14. B. B. ^c T. 13. f. 14. a a. b b. ^d T. 13. f. 14. B. C. D. E.

The Medicinal Consideration.

Diseases of the Tongue.

Similar.

Organical.

Common.

The Tongue is subject to divers Diseases, Similar, Organick, and common. For it is liable to all kinds of distempers; to loofness or softness, hardness, Density and Rarity of substance.

It is Organically Diseased, when it is swollen in all its dimensions and cannot be contained within the Hedge of the Teeth.

It is inflamed, when the Tumor called *Batrachium* rises under the Tongue, and turnes to an Impostum: out of which being opened, there flowes a substance like the white of an Egg and sometimes true quittor. If it be removed never so little from its place, the Cause is in the *Os Hyoides*, or in its Muscles, being either Palsied or Convulsed.

It is also Ulcerated by those simple Ulcers termed *Aphthæ*, and sometimes with Malignant Ulcers, which putrifie, Eat and consume the same.

whether its substance will grow again.

That the substance of the Tongue may grow again is confirmed by many Histories, and that the same being lost, a man is not wholly deprived of speech.

There have been some seen who could speak distinctly enough, so as to be understood, without a Tongue. But peradventure they had some Part of their Tongue remaining far within, which with the *Glottis* and *Uvula* did frame the Speech.

Its Symptoms

Speech Abolished.

Traulotis.

Psallotis.

Stammering

Tonguetied.

Tast Vitiated

Symptomes of the Tongue, of the first kind, are two, the Marring of Speech and Tasting. Speech is marred three waies, by Abolition, Imminution and Depravation. *Abolition* of Speech is termed *Anaudia*. Depravation of speech is of two sorts, *Traulotis*, *Psallotis* or *Balbuties*. *Traulotis* is when the Patient cannot pronounce some one letter, and *Psallotis* or *Psellismos* is, when he cannot pronounce divers letters. *Ischnophonia*, *Stammering*, is a stoppage of the Tongue, so that the Patient cannot proceed in his discourse, but repeats one and the same letter often over before he can proceed. *Anchyloglossos* and *Mogilalia* are when the

Tongue is tied either too strait or too loofe.

There is a threefold marring of the Tast, not distinguished by names: for it is abolished, depraved and diminished.

Chap. 13. Of the Larynx, or Head of the Wind-pipe. 207

The depravation of tast happens when the Tongue is filled with some evil Humor. So that what ever it tastes is infected with that Humor and tastes thereof. *Tast depraved*
Tast is abolished when the Tongue perceives no tast in any thing.

The motion of the whole Tongue is abolished in the Palsie, diminished when the half of the Tongue is Palsied, without any hurt to the Tast. *Palsie of the Tongue.*

In a total Palsie of the Tongue, there is great fear that the Patient wil fall into an Apoplexy, though *Fernelius* saw none to follow: but we must not be too confident, but meet the Disease when it is coming.

In a total Palsie of the Tongue the Patients are dumb: in a Palsie of half the Tongue, they speak untowardly.

A simple affection of the Tongue, is its Color changed, which comes not only from the primary distempers thereof, but chiefly by Sympathy with the Bowels. *Tongue discoloured.*

There is a certain trembling or wavering of the Tongue observed in Diseases of the Brain, which is a forerunner of the Phrensie, according to *Hippocrates* in his Coicks.

Chap. 13. Of the Larynx, or Head of the Wind-pipe.

THe Larynx is the Head of the *Aspera Arteria* or Wind-pipe, the instrument of modulating our speech, and the Channel by which Air is breathed in and out.

The Larynx.
its

Tis seated in the Forepart of the Neck which is termed the Throat.

Scituation

In Men it bunches out more than in Women, for the Women have two Kernels placed thereby, which swell more than they do in men, and so make the Neck even, taking away that same deformed Protuberancy, which is seen in Men.

It consists of five Cartilages or Gristles, whereof the two greatest do make up the Body of the Larynx: the first is called *Thyroides*, the second *Cricoides*, and those are the two largest and hardest. The third is the *Arytanoides*, which is placed upon the *Cricoides* and shuts up the Larynx. Within there is observed a fourth, which is called *Glottis*, being the principal Instrument of framing the Voyce, which is contracted and dilated with the *Arytanoides*: but the *Arytanoides* with the *Glottis*, is so firmly shut, when we draw our Breath in, that it strives against the Muscles of the Throat and Chest which resist the same, to hinder Expiration or the going out of the breath, by which all the Muscles are loosened, and Expulsion ceases from the inferior Parts. Only the *Glottis* Acts, in the Modulation of our Speech.

Gristles
Thyroides
Cricoides.
Arytanoides.
Glottis.

And that nothing either solid or Liquid might fall into the Larynx, it has a cover, which is called *Epiglottis*. It stands alwaies open for Respiration sake, nor is it depressed save by the weight of what is eaten and drunk.

Epi

The whol Larynx is Moveable by way of Ascent and Descent, through help of Muscles, for to Facilitate our swallowing.

Its Motion

Again, two Cartilages or Gristles are moved by themselves viz. The *Thyroides* and the *Arytanoides*. The former is widened and contracted, the latter is shut and opened. For those are contrary motions, which are performed by separated Muscles, which spring from the *Cricoides* an immovable Gristle, which is placed to fasten the Gristles and Muscles, as a foundation to make the Circle of the Larynx. Touching the Muscles, I shal speak in my Doctrine of Muscles.

Its Muscles.

The Larynx though it be Gristly, yet in Old Men it becomes boney, and it has been found to be so in some that were to be hanged, whom the Halter could not choak: and not only the Larynx, but also the gristly Channel of the *Aspera Arteria*. Either those parts were boney or the Halter way too thick, so that it could not sufficiently force and rend the same.

The

The Medicinal Consideration

Diseases of
the Larynx.

The *Larynx* is subject to a distemper, a Tumor and Inflammation, which when it happens, it hinders Speech and Breathing and strangles the Patient without any appearance of swelling, without.

Squintie.

Within fifteen or twenty hours it kills a Man, his mind and senses remaining sound and perfect. An Horrid Symptome it is, in which besides general Remedies, if Scarification of the Neck, wil do no good, we must proceed *ad Bronchotomiam*, viz. To open the Part by Section.

And this Disease is that most Pernicious *Angina* which *Hippocrates* makes mention of: Liquid things penetrate into the Stomach, but al breathing is stopped, and consequently sudden death must needs follow.

Privation of
Speech.

Hoarsness.

The Action of the *Larynx* is breathing, and the forming of speech and singing. Privation of speech is termed *Aphonia*, the depravation thereof is *Raucedo* Hoarsness: the Imminution thereof is called *Ischnophonia*.

want and difficulty of breathing.

The Interception of Respiration is termed *Apnoia*, the Imminution thereof *Dyspnoia*.

Both these Actions are hurt, either by a proper Disease of the *Larynx*, or of the neighbouring Parts, or of the Parts remote, especially of the Lungs, from whence the matter of speech is supplied and respiration proceeds. For the *Larynx* affected, does only stop the waies of breathing.

Diseases of the
Epiglottis.

The *Epiglottis* has its Diseases; either it is relaxed, or it is too much contracted and straitned, or it becomes hard, whence proceeds difficulty in swallowing.

Some there are who can more easily Swallow meat than drink, and in such the *Epiglottis* is become hard and stiff, so that it wil not be born down save by the weight of solid meat, with which that which is liquid slips along.

When it is become loose and Flaggy by reason of a Catarrh, it cannot be conveniently raised up; and when it is become straiter and narrower than it ought, it does not exactly shut the *Arytenoides*: which causes that crumms of bread and some portion of what is drunk, do slip into the Wind-pipe.

Nature has provided against this inconvenience, having by the sides of the *Glottis*, which is almost alwaies shutting, framed and set certain Cavities, which receive, such portions of meat or drink as slip beside, so that they are cast out again by coughing.

T. 13. f. 9. and 10. E E. T. 13. f. 1. and 2. f. 8. A. T. 13. f. 3. and 4. f. 9. and 10. D D. f. 5. and 6. f. 10. a a. f. 10. beneath A. T. 13. f. 7. 9. and 10. A A. f. 8. 9. 10. Ec. f. 9. and 10. between A. and E. s f. 9. and 10. E E.

Chap. 14. Of the Aspera Arteria or Wind-Pipe.

Use of the wind.

IN the Fore-part of the Neck is placed the Channel of the *Aspera Arteria*, the Instrument of speech and breathing, because it brings Air into the Lungs and carries out sooty Vapours; also there the Voice is formed and begins to be Articulated.

Its Gristles.

It consists of many Semi-circular Gristles, which are severed one from another, and are imperfect behind, not filling up the Circle, by reason of the *Oesophagus* or Gullet which lies beneath it, being the Channel of Meat and Drink.

Its Membrane.

The *Aspera Arteria* or Wind-pipe is lined within by a Membrane, which is drawn from the Mouth into the inner parts of the Wind-pipe and *Oesophagus*.

the Sciatica Vein, then from the *Saphena*. Howbeit *Galen* in his second Book *Secundum Locos* Chap. 2. The Sciatica Vein not appearing, admits the *Saphena* to be opened in stead thereof. And if it appear not in the outward Ankle, its branch must be opened, on the *Tarsus* or pulp of the Foot beneath the Ankle, or above the Ankle, if it be visible.

Its also possible to make it the more apparent by such a kind of Ligature as the *Author of the Book de Anatomia Vivorum* has described, made with a long and broad Swath-band brought from the top of the Hip as low as the Ankle.

^a T. 1. f. 1. L. T. 24. f. 1. B B. ^b T. 1. f. 1. M. T. 24. f. 1. C C. ^c T. 1. f. 1. N. T. 24. f. 1. f f. &c. ^d T. 1. f. 1. P. ^e

^a T. 1. f. 1. Q. R. T. 24. f. 4. a a a. &c. ^b T. 1. f. 1. S S. T. 24. f. 4. m. ^c T. 24. f. 4. f f. ^d

Chap. 6. Of the Arteries which are opened.

THe Ancient Physicians were wont to open Arteries as well as Veins. Howbeit *Horatius Augenus* in his Book of Blood-letting, dissuades the opening of Arteries, because he never saw any Artery opened, that could be stopped again. *Aurelianus*, Favours his Opinion, in his 1. Book of Chronick Diseases Chap. 5. Howbeit *Galen* in his Book *de Venæ Sectione*, commends the opening of the Smaller Arteries in very bitter and old paines of the Head.

whether Arteries may be opened?

Heurnius did wish, that in some part or other it might be safe to open an Artery in burning Feavers, because one Porringer of the Arterial blood drawn out, would cool the Patient more, than to loose ten Porringers of the venal blood. And in his *Commentary upon the 23. Aphorisme of the 1. Book*, he saies that in the Hungarian Feaver, when very red blood drops out at the Nose, it would do the Patient good to draw a little blood from an Artery. But who (saies he) dares open an Artery? I desire that all learned Artists would think of it.

what Arteries are to be opened?

I say therefore, and aver, That in *Paris*, the Arteries of the Forehead and Temples, before and behind the Ears, are successfully opened in Ancient or very acute paines of the Head, in the Phrensie, Inflammations and extream paines of the Eyes and Ears.

In the Forehead. In the Temples

As for the opening of the temporal Artery *Ibadens Dumas*, in the 12. Chap. Of his *Miscellanies*, shews how profitable a Remedy, it is.

Lazarus Sotus aforementioned, in the same place, observes that the Arteries behind the Ears are profitably opened in *Portugal*.

Ludovicus Mercatus a Spanish Physician suspects this opening of these Arteries, for fear it should make Men Barren. But daily experience has delivered us from that fear.

An Artery seated in the hinder Part of the Head is opened, the Hair being first Shaven off, and the Head and hand being fomented in hot water, or rubbed with a Sponge, that it may appear. The manner of opening this Artery, is not unlike that of the temporal Artery, and therefore that same way of *Paulus Aegineta*, *Aetius* and *Albucasis*, is to be rejected, who did first cut the Skin before they opened the Artery.

In the hind Part of the Head.

Galen in his Book of Blood-letting near the end, in an Inflammation of the Liver opened the ^a Artery, which Runs out between the Thumb and Fore Finger.

In the Hand

Which, *Prosper Alpinus* observes to be very usual in Egypt, in his third Book and 12. Chap. *De Medicina Egypti*. And *Septalius* in his 6. Book of *Animadversions*, Article 122. Judges that in a Palpitation of the Heart, the Arteries which Run along the Fingers may safely be opened. Which may likewise be done in the *Tarsus* and *Meta-Tarsus* of the Foot, according to the Advice of *Galen* in his 3. Book of *Anatomical Administrations*, and the last Chapter.

In the Foot

In other Parts Arteries may not in any wise be opened, unless they have a bone under them, that they may be pressed close down to make the Orifice grow together again: and therefore in a lean Body, an Artery being unawares opened in the Arm, may be closed again, if it be timely and closely tied as is fitting, to avoid *Aneurisma*.

An experiment
of *Benedictus*
for the Rheu-
matism.

Before we think of opening the Arteries of the Head to turn away Fluxions, that experiment of *Alexander Benedictus* will not be unprofitable, to apply unto the Shorn Head, Medicines that are to stop Rheums falling into the Eyes, must be applied from the Eye-brows unto the Crown of the Head: if the Eyes begin to appear dry, it is manifest that the Rheum falls into them by those Veins which are under the Skin: but if they continue moist, it is evident the Humor flows into them from under the bone.

Now the foresaid Mixture of *Alexander Benedictus* which stops Rheums is this. Make a Cataplasme of Courie bran, fine Frankincense, the white of an Egg, a little Vitriol and Stone Alum; and apply it as a foresaid.

Chap. 7. Of the Muscles and first of the Forehead Muscles.

The Forehead
Muscles should
rather be called
the Eye-brow
Muscles.

Intending to explain all the Muscles of the Body, I will begin at the Frontal or a Forehead Muscles, which I conceive are ordained rather to move the Eye-brows, than the Forehead it self.

They have their original from the upper Parts of the Forehead, and being spread out upon the bone thereof, they end at the Eye-brows, that they might lift them up. They are severed in the midst of the Forehead, right above the Nose. And because we do at our pleasure depress and draw together our Eye-Lids into wrinkles, we must assigne to each of them its Muscle, and I can find no other save the Orbicular Muscle of each Eye-Lid; for the Eye-brows cannot be drawn down without the Eye-Lids be closely shut.

^a T. 15. f. 1. EE. ^b T. 15. f. 1. FF. \square

Chap. 8. Muscles of the hinder Part of the Head.

IN the after Head are found Muscles, or rather fleshy Membranes, which draw backwards the Skin of the Head in such persons as have the said Skin movable. These Muscles, as also those of the Forehead, are portions of the *Musculus Latus* or Broad Muscle; which *Sylvius* does neatly compare to a riding Hood, taking away only as much as is covered with a little cap on the top of a Mans Head: and therefore the broad Muscle does cover the Neck, Face, Fore and side Parts of the Head.

^a T. 15. f. 1. EE. ^b T. 15. f. 1. FF. \square

Chap. 9. Muscles of the Eye-Lids.

The first.

THE two Eye-Lids are moved by four Muscles, of which three are orbicular, and one is straight belonging to the upper Eye-Lid, which arises at the internal Cavity of the Eye, and being spread out upon the Muscles, which lifts up the Eye, it reaches unto the Eye-Lid.

The second.

The first of the orbicular or round Muscles, is the *Musculus Ciliaris*, which compasseth about each of the Eye-Lids. The other is drawn out under the Eye-lid, arising from the Circumference of the *Orbita* or Socket of the Eye.

The Third.

The third round Muscle being of a Fingers breadth, compasses the Surface of the *Orbita* or Socket, and being placed under each Eye-Lid, and reaching as far as the Eye-brow, and closely shutting the two Eye-Lids, it lifts up the lower and

The fourth

draws down the Eye-brow.

Chap:

Chap. 10. *Muscles of the Eyes.*

THere are reckoned six Muscles of the Eye, four Straight and two Oblique, which are named from their Situation and action. One is termed ^c *Supernus* and *Attollens Oculum*, the upper, and the Eyes up lifter; another is called ^d *Infernus* and *Deprimens Oculum*, the lower and Eye Depresser; of the two Lateral or side Muscles, one at the greater corner of the Eye is termed ^e *Leſtorius*, the Readers or the Students Muscle; the other placed at the smaller corner is called ^f *Indignatorius*, the Disdeigners Muscle.

The Attollens.

The Deprimens

The Adducens

They all arise from the Cavity of the Socket of the Eye and the broad Nervous production, and are inserted into the Cornea Tunica under the Conjunctiva.

The Abducens

The Contranitiency of these Muscles pulling one against another is necessary, that the Eye might be movable to and fro, which being depraved, the Eye is drawn to some one side, and so abides in that posture.

And that the Eye might be drawn back towards the greater Corner, and might be fixed in continual reading or looking upon somewhat, Nature has framed two other Muscles, which are termed Oblique, because they direct the Oblique motion of the Eye, which is none at all, neither can the Muscles themselves perform such a Motion in regard of their Original and Insertion, which ought to be contrary and opposite.

The *Musculus Obliquus* ^a Major, greater Oblique Muscle, or *Trochleator*, contains in it a wonderful peice of Workmanship, which is found in Mankind, detected by *Rondeletius* and observed in some great Fishes: for taking its rise from the Cavity of the Orbita, it produces a thin Tendon, which being drawn through a Transverse ^b Gristle affixed unto the bone, by and beneath the *Glandula Lachrymalis* or weeping Kernel, is after widened and spread out upon the Eye.

The Obliquus Major.

The *Obliquus* ^c Minor drawn out externally by the greater Corner, and rowled athwart about the Globe of the Eye, comes as far as the Tendon of the greater Oblique Muscle, that the Nervous productions of both the Oblique Muscles might meet together to draw back and fix the Eye towards the Nose, that from both the Eyes beholding, one Pyramid Line may pass unto the visible Object.

The Obliquus Minor.

^a T. 19. f. 1. A. B. ^b T. 15. f. 1. F. F. ^c T. 19. f. 3. A. 4. 5. A. ^d f. 3. 4. 5. ^e f. 3, 4, 5. C. ^f f. 3, 4, 5. D. ^a T. 19. f. 3. and 4. F. ^b f. 3. and 4. G. ^c f. 3. and 4. E.

Chap. 11. *Muscles of the external Ear.*

They are common and proper, which are Seldom moved, because the Ear itself is rarely moved. They are therefore rather marks and signs of Muscles, than true ones, such as are found in Brute Beasts which move their Ears.

Of the external Ear.

And therefore a portion of the frontal Muscle reaching unto the Ear, a portion of the *Cutaneous* or Skin Muscle drawn unto the Pulp of the Ear, and a Part of the *Occipital* or after Head Muscle, stretched out behind the Ears, do make the common Muscles.

The common.

There is only one proper Muscle, which lurks under the Ligament of the Ear, it arises from the Mammillary Process, and is inserted into the Root of the Ear.

One proper.

The later Anatomists do make reckoning of two Muscles appertaining to the internal Ear, one of which is ^a external in the auditory passage or hole of the Ear, which draws back the Membrane of the Ear: the other is within the ^b *Concha*, fastened to the Mallet or Hammer.

Internal Ears

First.
Second

In Bruts the Muscles of the internal Ear are more evident than in Men.

^a T. 19. f. 3. and 4. F. ^b f. 3. and 4. G. ^c f. 3. and 4. E. ^a T. 20. f. 5. A. ^b T. 20. f. 5. C C. ^c

Chap. 12. Muscles of the Nose.

One Common. They are common and proper.

The common is only one, being the upper portion of that Orbicular Muscle which compasses the Lips, which draws the Nose downwards, when the upper Lip is drawn down.

Six proper.

Two Muscles do lift up the Nose, on each side one, drawn from the space between the Eye-brows and fastened to the bone of the Nose, and so called to the wings or battlements thereof; the motion of these Muscles, when they act together is easily perceived in the drawing up and crimping or wrinkling of the Nose.

In Persons that are largely Nosed, two little Muscles are found, spread upon the extremities of the Nose, which do widen the Laps of the Nose, without any elevation or lifting up.

Within the Nostrils under the Succingent Coat, there lies lurking a little Muscle of a Membranous Nature, which does stick to the internal Parts as far as the Laps of the Nose, it is said to contract the Nostrils.

^a T. 15. f. 1. N N. ^a T. 15. f. 1. G. ^c T. 15. f. 1. I. ^c

Chap. 13. Muscles of the Lips.

Seeing there are two Lips, each has its Muscles, and there are two common to both.

The first of the proper ones.

The upper Lip is drawn upwards by a Muscle which taking its rise from the hollow of the Jaw, beneath the Cheek bone, ascends obliquely or slanting to the upper Lip.

The second.

It is moved downwards by a Muscle brought from the midst of the lower Jaw, into the said Lip.

The third.

The nether Lip is drawn upwards by a Muscle, which being drawn out of the lower Parts of the Cheek bone, does end side waies upon the nether Lip.

The fourth.

It is moved downwards by a Muscle, which springing out of the Chin, is inserted into the middle Lip.

The common ones.

The common Muscles are the lateral ones, which do draw the Lips to the right or left side.

1. Zygomaticus.

The first is called *Zygomaticus*, being son what long and thin, and arising from the bone *Zygoma*, it is terminated in the meeting of each Lip.

2. Buccinator.

The other common one, is vulgarly termed *Buccinator* or the *Trumpeter*, it were more rightly called *Bucco* the Cheek driver, because it stirs the Cheeks, whilst it drives the meat this way and that way, in the action of chewing.

It arises from the top of the Gums or the bones in that place near the farthest grinders, and ends in each Lip. It is loose and slack, that it may give way inwards, and perform its Office of forcing, as the Muscles of the belly do; and that it may give way, when the Mouth gapes wide.

Sphincter of the Mouth

There is added a round Muscle, which makes the proper substance of the Lips, by the service whereof the Mouth is drawn together, the Lips are opened, go inwards, and swell. It might well be called the *Sphincter* of the Mouth, or the *Pylorus*.

^a T. 15. f. 1. K. ^b f. 1. M. ^c f. 1. N. ^a f. 1. I. ^c f. 1. O. ^c f. 1. ^c

NN

Chap.

Chap. 14. Muscles of the lower Jaw.

They are on either side six. The *Temporal* Muscle, being a very strong one The *Temporal* lifts up the Jaw. It arises from the whole Cavity of the Temples, and being carried along under the *Os Zygoma*, it is by a very strong nervous Tendon inserted into the sharp process of the Jaw-bone.

This Muscle is assisted by the *Pterygoideus Internus*, arising from the Cavity of the *Apophysis Pterygoidea*, and terminated at the corner of the inferior Jaw. It is called by *Galen* *Masseter Internus*.

The Jaw is drawn down wards by the *Digastricus* or *Two-Belly'd Muscle*, and the *Musculus Latus* or *Broad Muscle*.

The *Digastricus* or *Two-Belly*, being in the middle Nervous and fleshy at the Ends, springs from the *Apophysis Styloides*, and being in the Middle reflexed about the *Stylo-Ceratoides*, it is inserted into the Chin, under the bending of the Jaw.

The *Musculus Latus* or *Broad-Belly*, arises from the upper Part of the Breast-bone, the *Clavicula* and Shoulder point, and cleaves firmly to the Basis of the inferior Jaw, muffling the Neck and whole Face; and by reason of the afore-said Adhesion, it is said to draw the Jaw downwards.

Pterygoideus Externus, the external wing fashioned Muscle forces the Jaw forwards, which being swelled does lightly drive the Jaw-bone forwards: which happens in the overshooting of the Jaw-bone, when the lower Teeth are above the upper Teeth.

The Jaw is plucked about this way and that way by the *Masseter* or *Chaw Muscles* being in its Original *Two-Headed*, one of whose heads arises from the *Os Zygoma*, the other beneath the said bone; each of which being furnished with divers Fibres which Cross one another, is inserted into the Corner of the inferior Jaw. It may easily be divided into two Parts.

Chap. 15. Of the Muscles of the Os Hyoides.

Because the bone termed *Os Hyoides*, is placed in the Neck to a prop and foundation for the Tongue and *Larynx*, it has obtained Muscles as well as Ligaments, by which it is held suspended, that it might be moved with the Tongue and *Larynx*.

And therefore its Muscles are common to the Tongue and the *Larynx*.

The bone *Hyoides* has ten Muscles, on each side five, for I add the Muscle termed *Myloglossus* (which is commonly attributed unto the Tongue) and I call it *Mylohyoides*, because, it does not any waies touch the Tongue.

T. 15. f. 1. P. P. f. 2. A. A. T. 15. f. 2. a. a. D. D. f. 1. T. T. f. 2. C. C. T. 10. f. 1. T. 15. f. 2. F. T. 15. f. 2. E. E. E. E. f. 1. S. f. 2. B. B. T. 13. f. 11. and 12. A. B. C. &c.

The *Os Hyoides* is lifted up by the Muscle *Geniohyoides*, it arises from within the Chin and is inserted into the Basis of the *Hyoides*.

Assistant hereunto is the Muscle *Mylohyoides*, it arises from within the Jaw in the Quarters of the Grinding Teeth, and reaches to the Basis of the Bone *Hyoides*.

The bone *Hyoides* is drawn downwards by the Muscle *Sternohyoides* which springs from the top of the Breast bone, and drawn out upon the Weland is inserted into the Basis or bottom, of the said bone *Hyoides*.

The Muscle *Stylocerathhyoides*, from the *Apophysis Styloides* is carried into the Horns of the *Os Hyoides*.

Chap, 16, Muscles of the Tongue.

Genioglossus. **T**He Tongue is forced forward by the Muscle *Genioglossus*, which growing out of the inner side of the Chin, is terminated to the Tongues Root.

Basiglossus. It is drawn back by the Muscle *Basiglossus* which takes its rise at the Basis of Os *Hyoides*, and is carryed unto the Root of the Tongue.

Styloglossus. It is forced sideways to the right and left, by the Muscle *Styloglossus*, which taking its beginning at the *Apophysis Styloides*, is extended into the middle, very near of the Tongue.

^a T. 13. f. 13. B B. ^b f. 4. E E. ^c f. 13. D D. ^d f. 1. E E. ^e f. 13. C C. ^f f. 14. B B. ^g f. 14. D D.

Chap, 17, Muscles of the Larynx.

THe whol body of the *Larynx* consisting of five *Griffles*, is moved upwards and downwards.

Hyothyroides. It is drawn upwards by the Muscle *a Hyothyroides*, which arising from the Basis of the *Hyoides* bone, is inserted into the external middlemost of the *Thyroides*.

Bronchius. The Muscle *b Bronchius* draws it downwards, which taking its rise, from the inner side of the Breast bone, and stretched out upon the Channel of the *Aspera Arteria* or *Wesand*, it ascends unto the Basis of *Thyroides*.

Two only of the *Griffles* of the *Larynx* are movable, viz. The *c Thyroides* and the *d Arytenoides*, and to procure their motion they have little Muscles, which spring out of the immovable *Griffle* *Cricoides*.

Cricothyroides Anticus. The *Thyroides* is dilated by the Muscle *Cricothyroides Anticus*, which begins at the outter forepart of *Cricoides*, and ends within the internal sides of *Thyroides*.

Lateralis. The said *Thyroides* is contracted by the Muscle *f Cricothyroides Lateralis*, which springing from the lateral part of *Cricoides*, is inserted externally into the sides of *Thyroides*.

Thyroarytenoides. The *Arytenoides* is opened by the Muscle *g Thyroarytenoides*, which springing from the inner and foremost part of the *Thyroides*, ends into the sides of the *Arytenoides*: or rather it takes its rise from the *Cricoides* and *Thyroides*, being placed between both.

Arytenoides. The *Arytenoides* is shut by one only Muscle called *Arytenoides*, which ^a compasses about and shuts the *Arytenoides*, like the *Sphincter* Muscle, and also with its Basis it streightens the *Glottis*, for to make the voyce sound the better.

The *Epiglottis* has ⁱ no Muscles to lift it up and shut it down in Mankind, as it has in Brute Beasts.

^a T. 13. f. 8. B B. ^b f. 8. C C. ^c f. 1, 2. 8. A. ^d f. 5. and 6. ^e f. 3. and 4. f. 9. and 10. D D. ^f f. 9. C C. ^g f. 9. B B. ^h f. 10. B B. ⁱ f. 9. and 10. A. ^j

Chap, 18, Muscles of the Pharynx.

THe *Pharynx* which is the beginnig of *Oesophagus* or the Gullet, has obtained from Nature seven Muscles, of which three have fellows and the fourth is without companion namely that which is termed *Oesophageus*.

Spheno-Pharyngeus. The first is *a Spheno-Pharyngeus*, which arises from a certain sharp point of the *Sphenoides* near the *Styloides*, and bending a little downwards, it ends in the sides of the Jaws, that it may draw the *Pharynx* upwards.

The second is ^b *Cephalo-Pharyngæus*, which arises from that part where the Head is Joyned to the Neck, and descending is spread out into the *Pharynx*, and seemes to make the very coat thereof. *Cephalopharyngæus.*

The third is ^c *Stylo-Pharyngæus*, which arises from the *Apophysis Styloides*, and is implanted into the side of the *Pharynx*, to serve to widen the same. *Stylopharyngæus.*

The Muscle *Oesophagæus*, does draw together and close the ^d *Pharynx*, which growing out of one side of *Thyroides*, and compassing round the hinder part of *Oesophagus*, is implanted into the other side of *Thyroides*; or being outwardly fastened to both sides of *Thyroides*, it draws together the beginning of the *Oesophagus* and purles the same like the *Sphincter* Muscle of *Anus*. *Oesophagæus.*

^a T. 3. f. 2. and 3. B B. ^b f. 2. and 3. A A. ^c f. 2. and 3. C C. ^d f. 2. and 3. D D.

Chap. 19. Muscles of the Gargareon, Uvula, or Mouth Palat,

The *Uvula* has two Muscles ^e on either side.

The Muscle *Ptery-Staphylinus* ^f *externus*, taking its Rise from the upper Jaw under the last grinding Tooth, ends in a smal Tendon ^g which passes through a chink ingraven on the upper side of the *Pterygoides*: and there being turned back, as it were through a pulley, it is inserted into the sides of the *Uvula*. *Pterystaphylinus externus.*

The *Ptery-Staphylinus* ^h *internus*, cast out of the nether part of the inner Skirt of the *Pterygoides*, it has a peculiar movable Gristle ordained for its original, and ascending according to the Longitude of the internal Wing or Skirt of the *Pterygoides*, it ends at the *Uvula*. *Internus.*

^e T. 13. f. 15. A. ^f f. 15. B B. ^g f. 15. b b. ^h f. 15. C C.

Chap. 20. Muscles of the Head.

The Muscles of the Head are proper or Common.

The Common are those which move the Neck and Head both; such as are the Muscles of the Neck: the proper are such as move the Head, the Neck remaining unmoved.

Now the proper are fourteen, on each side seven, six of which are placed in the hinder part.

There is one only in the Fore part, which is called ^a *Mastoidæus*, and bows the Head; it arises from the top of the Breast bone and middest of the *Clavicula*, and is obliquely inserted into the *Apophysis Mastoides*. *Caput flectens. Mastoidæus.*

Sometimes in the forepart of the Neck, there is another Muscle next the Long Muscle, which helps the *Mastoidæus* to bend the Head: and I have many times shewed this Muscle, and sometimes I have seen it wanting.

Six Muscles do extend the Head: of which two are large, the other four smal. *Extenders.*

The first of the larg ones is called ^b *Splenius*; which arising from the sharp points of the five uppermost *Vertebra's* of the back, and the four lowest of the Neck, it is inserted into the hinder part of the Head. *Splenius.*

There comes the other large Muscle to assist the former, and is called ^c *Complexus*. It springs from the transverse or overthwart Eminencies or Apophyses of the fore-said *Vertebra's*, and is terminated in the after part of the Head. *Complexus.*

The lesser Muscles are some straight, others crooked; and of both these, some are greater, others less. *Reflex's major.*

The

The greater ^d straight Muscles, arising from the Spine or point of the second spondile, *Vertebra* or Knuckle, are inserted into the after side of the Head.

Rectus minor

Under them the ^e two lesser arising from the hinder part of the first *Vertebra*, are terminated in the after side of the Head.

Obliquus minor.

The greater ^a Oblique ones do arise from the spine or point of the second *Vertebra* and reach unto the overthwart Eminence or Apophysis of the first *Vertebra*; and from the same place the Lesser ^b Oblique or crooked ones do arise and are terminated in the *Occiput*, or after Part of the Head.

Obliquus major.

^a T. 14. f. 2. KK. f. 3. H. f. 4. FF. ^b f. 2. HH. ^c f. 2. II. f. 3. EF. ^d f. 3. and 4. II. ^e f. 3. i. f. 4. KK. ^a T. 14. f. 3. L. f. 4. GG. ^b T. 14. f. 3. K. f. 4. HH. ^c

Chap. 21. Muscles of the Neck.

The Neck benders.

THe Neck has eight, on each side four, being placed before and behind, to bend the Neck and extend the same again.

The Longus.

It is bent by the *Musculus Longus* and the *Muscle Scalenus* or the uneven-sided Muscle.

The ^c Long Muscle being situate under the *Oesophagus*, springs out of the body of the third *Vertebra* or Knuckle bone of the back, and ascends laterally connexed or knit unto all the bodies of the *Vertebra's*, ending into the former part of the first *Vertebra*.

The Scalenus.

The *Scalenus* arising from the ^d first Rib of the Chest, it is inwardly ingrafted by oblique Fibres into all the overthwart or transverse Eminencies of the Neck-bones: through it the Vessels are drawn, which are to be distributed into the Arm.

The Extenders Spinatus

The Neck is extended or stretched out by two Muscles.

The *Spinatus* Muscle ^e arises from the Roots of the seven uppermost *Vertebra's* of the Chest and five of the Neck; and is inserted into the Spina or point of the second *Vertebra* of the Neck.

Transversarius.

The Muscle *Transversarius*, arising from the ^f transverse Apophyses or Eminencies of the six uppermost *Vertebra's* of the back, is planted externally into all the transverse Eminencies of the Neck.

^c T. 13. f. 18. A A. ^d T. 13. f. 18. BB. ^e T. 14. f. 4. DD. ^f T. 14. f. 4. EE. ^c

Chap. 22. Muscles of the Shoulder-blades.

Shoulder blades lifter.

They are four in Number. The Muscle *Levator s Proprius*, does lift up the Shoulder blade. It arises from the transverse or overthwart Apophyses or Eminencies of the second, third and fourth *Vertebra* of the upper part of the Neck, and ends in the uppermost Corner of the Shoulder-blade.

Trapezius.

The Muscle *Trapezius* ^a arises from the hinder part of the Head, at the Points of five *Vertebra's* of the Neck, and of eight or nine of the uppermost *Vertebra's* of the Chest, and is inserted into the Basis of the Shoulder blad and the Spina, as far as the shoulder tip. It causes divers motions according to the original and direction of the Fibres; that is, according to their Rise and insertion.

Serratus minor

The Shoulder-blade is drawn forwards by one only Muscle termed *Serratus* ^b Minor, which arises out of the four upper most Ribs, and ends in the *Coracoides*.

Rhomboides

It is drawn backwards by the ^c *Rhomboides* or lozing fashioned, or diamand fashond Muscle, which arises from the three points of the lower *Vertebraes* of the Neck,

Neck, and the three points of the uppermost *Vertebrae* of the Chest, and is inserted into the external Basis of the Shoulder-blade.

Although by its own weight it return to the natural Situation: yet a^d portion of *Musculus Latissimus*, running out unto the Arm, cleaves by a loop to the lower Corner of the Shoulder-Blade, and is said to draw the Shoulder-Blade downwards.

Chap. 23. Muscles of the Arm.

They are nine. The *Muscle Deltoides* and *Supra Spinatus* do move it up- *Arm lifters.*
wards.

The *Deltoides* does arise from the middest of the *Clavicula*, the Shoulder tip, *Deltoides*
the whol spine of the Shoulder-blade, and is carried out unto the middle of the Arm.

The *Supraspinatus* being thrust into the Cavity above the *Spina* or sharp point *Supraspinatus*
of the *Scapula*, and being conveyghed under the Shoulder tip, is inserted into the Neck of the Arm.

The *Latissimus* and *Rotundus Major*, do move the Arm downwards: the *Latissimus* springs from the sharp prominencies of the *Os Sacrum*, of the *Vertebrae* *The depressers*
of the Loins, and of nine *Vertebrae* of the Back: it is inserted into a part of the *Latissimus.*
Arm, not far below the Head.

It is assisted by *Rotundus Major* or the larger round Muscle, which arises from *Rotundus ma-*
the whol lower Rib of the Shoulder-blade, and ends very near in the middle of the *tor.*
Arm.

The *Pectoralis* and *Coracoides* draw it forward. The *Pectoralis* arises out *The drawers*
of the first sixt and seventh true Ribs, the Brest-bone and more than the middle *to.*
of the *Clavis*; and it is inserted by an acute Tendon into the middle of the Arm *The Pectoralis.*
between the *Deltoides* and the *Biceps*.

The Muscle *Coracoides* springs out of the *Apophysis Coracoides*, and ends *Coracoides.*
very near in the middle of the Arm; it draws the Arm towards the left Shoulder.

The Arm is moved backwards by three Muscles, *Infraspinatus*, *Rotundus Minor*, and *Immersus*. *Drawers back.*

The *Infraspinatus* arising in the middle between d the lesser round Muscle and *Infraspinatus*
the *Spina*, ends into the Neck of the Arm which is muffled about.

The *Rotundus minor* begins at that Cavity which appears under the lower Rib *Rotundus*
of the Shoulder-blade, and ends in the Neck of the Arm. *minor.*

Immersus or the *Subscapularis* does possess the hollow and inward Part of the *Immersus*
Omoplate or Shoulder-blade, and is carried out unto the Neck.

The three last Muscles which act al at once, do carry about the Arm upwards
with a sudden motion flanting outwards, so that the motion seems to be doubled.

Chap. 24. Muscles of the Cubit.

The Cubit consists of two Bones, which as they are Knit together by divers *Ar-*
ticulations, so do they perform divers motions.

The Cubitus guides the motion of the Bending and extending. The *Radius*
directs the motions of Pronation and Supination, and therefore they have proper
Muscles for these motions.

The Cubit is bended by two Muscles Scituate in the internal Part of the Arm *viz.* *Cubit benders*
The *Biceps* and *Brachialis internus*.

The *Biceps* arises from a^a double beginning, the one of which from the extremity *Biceps*
of the Cavity of the *Glenois* is conveyghed through the cleft of the Arm, the other
taking its Rise from the *Apophysis Coracoides*, they are after united and make one
F f Tendon,

Tendon, which is inserted into the inner Part of the *Radius*, there where it buches out.

The *Brachialis Internus*, being placed beneath the Biceps, takes its rise from the middle of *Os Brachij*, unto which it firmly adheres, and is terminated between the *Radius* and the *Cubitus*, in that Part where they are fastened together.

The Cubit is extended by four Muscles, *Viz.* *Longus*, *Brevis Brachialis externus*, and *Angoneus* or *Cubitalis*.

Longus, the long Muscle, arises from the lower Rib of the Shoulder-blade near the Neck, where it has a peculiar Cavity, and it is terminated into the Elbow.

Brevis, the short Muscle, springs from the hinder Neck of the Arm and ends likewise at the Elbow. Both those Muscles do make up one strong and sinewy Tendon.

For the third Muscle *Galen* in the first Book and last chapter of his *Anatomical Administrations*, reckons a lump of Flesh which is confounded with the two foregoing Muscles, and inserted into the same place. I call it *Brachialis externus*, because being spread upon the outside of the Arm, it is placed beneath the other two last mentioned. In the same place *Galen* does acquaint us, that any man may accurately separate these three Muscles following the rectitude of the Fibres.

The fourth Muscle called *Angoneus*, is Scituate in the bending of the Cubit on the hinder side; which is called *Agcoon* or *Ancoon* and answers to the *Musculus Popliteus*. It arises out of the lower and hinder Part of the Arme, being Scituate between the *Radius* and *Cubitus*: and it is inserted by a sinewy Tendon into the side of the *Cubitus*, a Thumbs length below. Sometimes it cleaves so fast to the Flethy end of *Brachialis Externus*, that there is no apparent difference to be discerned between them; and then it is Judged to be a portion of the *Brachialis externus*, extended so far as to that place.

Chap. 25. *Muscles of the Radius.*

The *Radius* is bowed downwards by the two internal Muscles, so called because they are placed in the inner Part of the Cubit; and one is called *Inferior Pronator*, and the other *Superior Pronator*.

The *Superior* being a round Muscle, springs from the inner Part of the inner knob of the Arm, and ends with a *Membranous* Tendon, obliquely carried unto the *Radius*.

The *Inferior Pronator Quadratus*, is carried overthwart from the lower Part of the Cubit unto the lower Part of the *Radius*, and is thereinto inserted, being altogether Flethy. Also it Knits the *Ulna* to the *Radius*, as if it were a Ligament.

The *Radius* is drawn down backwards by two external Muscles.

The *Longus Supinator*, springs out of the top of the Arm, above the external Knob, and being drawn out upon the *Radius*, it is inserted on the inside of the lower *Epiphysis* thereof, being fleshy.

Brevis Supinator, arising out of the outside of the inner Knob, is carried obliquely very near to the middle of the *Radius*, and turning back does straitly comprehend the same.

^a T. 22. f. 1. and 3. D. ^b T. 10. f. 1. A. B. T. 12. f. 1. E. ^c T. 22. f. 1. H. ^d T. 22. f. 3. B. ^e T. 22. f. 2. and 3. C. ^f T. 22. f. 1. B. ^a T. 22. f. 1. G. ^d T. 22. f. 1. 11. f. 2. B. ^c T. 22. f. 3. E. ^d T. 22. f. 3. F. ^c T. 22. f. 3. a. f. 4. G. ^a T. 22. f. 2. C. ^b T. 22. f. 2. D. ^c T. 22. f. 4. E. ^d T. 22. f. 4. F.

Chap. 26. *Muscles of the Wrist.*

THe Wrist is bended, stretched forth and laterally moved by two Muscles, the bender and extender of each side, acting both together.

It is bended by two inward Muscles, of which the one may be termed *Cubiteus*, *wrist-benders* the other *Radiens*, by reason of their Situation.

The *Cubiteus^a internus* takes its rise from the inner part of the inner Knob of the Arm, and being fastened unto the Cubit and to the fourth Wrist bone of the first Rank, it is drawn out aloft.

The *Radiens^b Internus*, having its original in the same place, and being stretched out upon the *Radius*, is inserted into that bone of the *Metacarpium*, which sustains the fore Finger. *Radiens Internus.*

The Wrist is extended by two external Muscles, which hold the same way with the internal, and are therefore called by the same names. *wrist extenders*

The *Radiens^c externus* or *Bicornis*, takes its rise from that bony point which is in the Arm above the Knob thereof, and resting upon the *Radius*, it sends forth a double Tendon, the one of which is inserted into the Wrist bone lying under the *Radius*, the other into that bone of the *Metacarpium* which is seated under the fore Finger. *Radiens Externus.*

Some will have this Muscle to be a double one, because it appears wholly distinct in its original and insertion. For that which is carryed to the Wrist grows out of the bony point of the Arm: the other arises out of the external Knob of the Arm and extends the *Metacarpium* with the Wrist.

It has its Tendons separated and inclosed in peculiar cases and sheaths, which are of a sinewy Gristly substance, without the Ring fashioned Ligament of the Wrist.

The *Cubiteus^d externus*, arising from the outward Apophysis of the Arm, and being carryed along the Cubit, it inserts its Tendon into the fourth bone of the *Metacarpium*, Scituate beneath the little Finger. *Cubiteus externus.*

^a T. 22. f. 1. N. ^b T. 22. f. 1. M. ^c T. 22. f. 3. H. ^d T. 22. f. 3. G.

Chap. 27. *Muscles of the Palme of the Hand.*

IN the Palm or Hollow of the Hand are found two notable Muscles, which are termed the *Palmar Muscles*, the one of which is short, the other long.

The *long Palmar Muscle* growing out of the ^a inner side of the knob of the Arm, is spread into the hollow of the Hand, as far as the first Articulation of the Fingers. *Long Palmar Muscle.*

In its original it is Fleshy and presently after lessens it self into a smal Tendon, which passing above the Ring-shaped Ligament of the Wrist, and not included with the rest of the Tendons; it is widened into a sinewy Membrane, which is so firmly fastened unto the Skin (to make the sense of feeling the more quick, and that the Hand may hold things the faster) that it is a very hard thing to sever it from the Skin.

Besides the Palmar Muscle in the hollow of the Hand, a Certain peice of Flesh *Short Palmar Muscle.* four Square of a Thumbs breadth is found upon the Ring-shaped Ligament; which is redder then the Flesh, between the Thumb and the middle Finger, and is sometimes single and sometimes double, looking like two Muscles: and being carryed under and implicated with the Palmar Muscle, it seems to take its rise from the Root of the Fleshy part of the Hand called *Thenar*, and to be inserted into that same eighth bone of the Wrist, which is placed out of order.

Its Office is to hollow the Hand and so to make Diogeneß his Dish to drink out of, together with the Muscles of the Thumb and the Hypothenar. This Muscle shall be named *Palmaris brevis*; the short Palm Muscle.

^a T. 22. f. 1. K.

Chap. 28. Muscles of the Fingers.

**Four Finger
benders.** **T**He Fingers are bended, stretched out, and moved sidewaies. There are two Muscles which bend the four Fingers, viz. The *Musculus Sublimis*, and the *Musculus Profundus*.

Sublimis The *Sublimis* arises from the inner, ^b part of the inner knob of the Arm, and produces foure ^a Tendons about the Wrist, which are terminated at the second Articulation of the Fingers, and have holes bored in them, to give passage to the Tendons of the *Musculus Profundus*.

Profundus. The *Profundus* springs out of the ^b upper parts of the *Cubitus* and *Radius* and being ^c divided into four, it is carryed through the holes of the Tendons of the *Sublimis*, unto the third Articulation of the Fingers.

Do but observe the Industry of Nature, who to the end the Fingers might be rightly bended, on the inside according to their length, she has framed a Channel of most hard Membranes resembling Ligaments, which Channel does straitly infold the Tendons of the *Musculus Profundus* and *Sublimis*, least in the bending of the Fingers the Tendons being bowed should be drawn out of their place, and like ropes rise up and lift up the Skin.

And although the Tendons be closely comprehended within the said Channel, yet have they their free course and passage, because the Channel is smeared with a fat and Oily Humor.

Lumbricales Out of the very Tendons of *Musculus profundus* by the Wrist, do arise the four ^d *Lumbricales*, being firmly fastened thereunto, and carried to the first Articulation of every Finger, where they unite themselves to the Interosseans.

Extenders The Muscles which extend the Fingers are *Common* and *proper*.

**Extensor
Magnus.** I call them common, which serve the four Fingers, such as the *Extensor magnus Digitorum* [the great extender of the Fingers] or which beside extension, do cause other motions, as the *Lumbricales* and *Interossei* joyned together.

The proper are they which belong and are attributed only to certain Fingers, as the *Extensor Indicis* [stretcher out of the fore Finger] and the *Extensor Auricularis* [stretcher out of the little Finger].

Magnus Extensor Digitorum, the great ^a Finger stretcher arises out of the outward Knob of the Arm, and by the ^b Wrist is cloven into four ^c Tendons, which end into the two lower Joynts of each Finger.

**Side way
movers.** The Fingers are moved sidewaies, which motion is commonly termed adduction and Abduction.

The Adduction or drawing to, is when they are drawn towards the Thumb; Abduction or drawing from, is when they are moved sidewaies from the Thumb.

Interosseans. And this motion is performed by the *Interossean* Muscles: of which there are three ^d External and as many ^c Internal, spread in the spaces between the Bones of the *Metacarpium*.

They arise from the upper Parts of the said bones near the Wrist, and in the first *Internodeum* or space between the Joynts, with a very smal Tendon, they creep side longs over the three bones of the Fingers, until they come unto the Roots of the Nails; in the former and upper Part whereof, the Tendons, being first united are terminated. And therefore the Interossean Muscles acting together, do keep the Fingers both stretched out, and one close to another, just as we hold our hands when we swim.

Moreover

Moreover you shal observe two Muscles, which are as it were external interos-
seans, which are spread without, upon the first and fourth bone of the Metacarpi-
um, the one of which called ^f Hypothenar, is Peculiar to the little Finger, and
may be divided into two.

Proper.

Abductor mi-
nimi.

It arises from the third and fourth Wrist bone of the second Rank, and is side-
waies inserted into the Joynts of the same Finger, to draw the same towards the
outside.

The other belongs unto the fore Fingers, and lying beneath the Antithenar, it
it grows out of the inner Part of the first bone of the Thumb and is inserted into the
Joynts of the Fore Finger, to draw the same unto the Thumb. So that it may be
called *Musculus Abductor Indicis*.

Abductor In-
dicis.

Besides the Tendon of the common extender, it has a Peculiar extensive Mus-
cle, which may be termed Indicator the Pointer, because this Muscle serves the
Finger to point withal.

Proper ex-
tenders.

Of the fore
Finger.

It arises from the middle and external Part of the Cubit, and is inserted by a
forked Tendon into the second Articulation: and the other Tendon grows together
with the Tendon of the greater extender.

There is a Proper extender ascribed to the little Finger. It arises out of the up-
per Part of the Radius being seated between the Cubitus and the Radius, and it
is with a double Tendon planted into the little Finger on the outside
thereof, but with another tendon it is mingled with the Tendon of the greater ex-
tender.

Of the little
Finger.

Mean while you shal observe the Lumbrical or worm Muscles, which are sometimes
three, other whils four, seldom five: which though they are implicated with the
Tendons of *Musculus Profundus*, and are constantly thought to arise there from;
yet I conceive, they are bred out of the sinewy and orbicular ^a Ligament of the
Wrist, that it might have a firm and stable Original.

^b T. 22. f. 1. O. f. 5. A. [■]

^a T. 22. f. 5. a a a a. [■] ^b T. 22. f. 1. P. f. 5. B. [■] ^c T. 22. f. 5. b b b b. [■] ^d T. 22.
f. 5. C C C C. [■]

^a T. 22. f. 3. K. [■] ^b f. 3. e. [■] ^c f. 3. f f f f. [■] ^d f. 4. I I I I. [■] ^e f. 2. f f f f. [■] ^f f. 2.
g. b. f. 1. S. [■] ^g f. 3. l. [■]

^a T. 22. f. 3. 6. [■]

Chap. 29. *Muscles of the Thumb.*

THe Thumb has peculiar Muscles, whereby it alone is bended, extended and
moved sidewaies.

Thumb Muscles

It is Extended by two long Muscles. One of which arising out of the ^b upper
and outward side of the Cubit, goes up upon the Radius, and being carried beyond
the Wrist, it is inserted into the first and second Joynt of the Thumb, by a double
and sometimes a triple Tendon.

Extenders

The other arises from the ^c same Part of the Cubit, but lower, near the Wrist,
and is inserted into the third Joynt of the Thumb.

The Thumb is bended by ^d one Muscle, which growing out of the Inside of the
Cubit, it carried unto the second and third Joynt thereof.

Bender.

It is moved sidewaies by two Muscles.

Lateral mo-
vers.

^b T. 22. f. 3. M. [■] ^c T. 22. f. 3. L. [■] ^d T. 22. f. 2. D. [■]

The Thenar ^a arises from the inside of the Wrist, beneath the
Thumb, and is inserted into the second Joynt of the Thumb, to draw it from the
Fingers.

The other Muscle termed ^b Antithenar, draws the Thumb towards the fore
Finger.

Finger. It grows out of the external side of the first bone of the *Metacarpium* which sustains the Thumb, and is inserted into the first Joynt of the said Thumb.

It is drawn to the four other Fingers by a ^c Muscle, which being Joyned unto, and seated beneath the Thenar, grows out of the three lower bones of the *Metacarpium*, and is inserted into the second Joynt of the Thumb. It may be called *Hypothenar Pollicis*, because it is spread out under the Thenar.

^a T. 22. f. 4. R. ^b T. 22. f. 1. Q. f. 2. F. ^c T. 22. f. 1. R. f. 2. G.

Chap. 30. Muscles of the Chest.

THe Muscles of the Chest are *Proper* or *Common*.

Those are said to be *Proper*, which particularly and properly belong unto the Chest; the *Common* are such as being destinated to some certain Part, yet do assist the Brest with their help, as *Auxiliaries*, such as are the upper Muscles of the Shoulder blade.

which widen.
The Chest. The Chest is widened or lifted up by five Muscles. Three of which are before *viz.* *Subclavius*, *Serratus major*, and the *Triangularis* or *Pectoralis internus*. One is hinderly Scituate *viz.* *Posticus Serratus superior*: and the fift is the *External Intercostal*.

Subclavius The *Subclavius* arises from the ^d inner part of the *Clavicula*, near the Shoulder tip, being of a *Fleshy* substance, and is inserted into the first Rib, near the Brest bone. ^d T. 10. f. 1. F.

Serratus major The *Serratus* ^a *Major*, reaches from the inner Basis of the Shoulder blade, unto six, and sometimes seven Ribs, of which the five lowest are true Ribs, and the two uppermore are bastard ones.

Serratus Posticus Superior The *Serratus* ^b *Posticus Superior*, being Scituate beneath the *Romboides*, grows out of the sharp points or spines of the three lower *Vertebrae* of the Neck, and the first spine of the Back; and ends into the three upper Ribs, and sometime the fourth.

External Intercostals. The eleven ^c *External Intercostals*, hold the place of one Muscle, which is carried Obliquely forward from the lower side of the upper Rib, into the upper side of the lower Rib. Unto those Muscles which widen the Chest, we must add the *Diaphragme* or *Midrif*.

Triangular Muscle. The *Triangular Muscle*, growing out of the middle and inner Part of the Brest-bone, is inserted into the Gristles of the lower Ribs, as far as the third or fourth bastard Ribbs.

Contracters. Three Muscles there are which *Contract* the Brest, the *Sacro-Lumbus*, *Intercostalis internus*, and *Serratus Posticus inferior*.

Sacro-lumbus. The *Sacro-Lumbus*, takes its original from the *Os* ^d *Sacrum* and the Spiny productions of the Loins, and is terminated into the upper Ribs, near unto their Roots; bestowing upon each Rib a double Tendon or Tendinous handle or clappe, an internal and an external; and therefore it serves both to depreis the Ribs and to raise the Back-bone; when it is bowed and bended forward.

Internal Intercostals. The *Eleven internal Intercostals*, which fil up the spaces between the Ribs, are reckoned to be but one Muscle. It is carryed obliquely from the nether Rib to the upper more. It has Fibres contrary to those of the external, cross wise intersected.

Serratus posticus inferior. The *Serratus Posticus* ^f *inferior*, growing out of the spines of the three lowest *Vertebrae* of the Back, and the first of the Loins, is *Terminated* into three or fower of the lower Ribs.

This same *Serraticus Posticus inferior*, is just opposite to the *Serraticus Posticus superior*, and both of them by a broad and *Membranous Aponeurosis*, do so grow together, that they serve instead of a band to bind and keep together the hinder Muscles of the Back-bone.

Others

Others do ad eight Muscles of the Belly, because more Muscles are requisite to cause violent Expiration.

^a T. 10. f. 1. C D. ^b T. 14. f. 2. E. ^c T. 10. f. 1. G G. ^d T. 14. f. 1. L L. f. 3. B B. ^e T. 10. f. 1. H H. ^f T. 14. f. 2. F G.

Chap. 31. *Of the Midrif.*

THe *Diaphragme* or Midrif is an^a admirable kind of Muscle, both in regard of its composition and continual Action, whiles it does night and day incessantly fan the Natural and Vital Parts, serving nevertheles as a Wal of partition to sever the one from the other. *Use of the Midrif.*

It arises from the Circumference of the bastard Ribs, through which it is obliquely drawn about, as far as to the *Vertebraes* of the Loins: the end or Sinewy Part thereof, is in the Nervous Centre. *Its Original.*

When we draw in the Air, it is contracted and bent, and when it draws the lower Ribs downwards and of convex becomes straight and even. When we blow the Air out, it is by help of the *Mediastinum* drawn upwards, and of straight is made Convex or bunching like the surface of a Bucklar. *Its Motion.*

^a T. 10. f. 1. I I. f. 6. and 7. the whol.

Chap. 32. *Muscles of the Back and Loyns, wherewith the Back-bone is moved.*

THe *Back* is not moved, because of the Ribs interposed, and the Penury of Muscles both internal and external; it has indeed Muscles spread upon the outside thereof, but they are for another use. So that between the Neck and the Loyns it remains immovable, whiles the extream Parts are moved. *The Back properly is not moved.*

Now the motion is made in the last *Vertebra* of the Back which is received on all hands by its neighbouring *Vertebraes*, and receives none; and because it is Contiguous with the Loins, *The Motion is attributed to the Loyns rather than to the Back*: although it belong to the whol Back-bone.

The Back-bone therefore, as the Loyns, are bowed and extended and drawn to the sides.

They are bowed by two Muscles, on each side one. The *Musculus* ^a *Quadratus* takes its rise from the hinder Part of the *Os Ilij* and from the inner side of the *Os Sacrum*; being inserted into the transverse Apophyses of the Loins as far as the last Rib, and of a Fleshy substance. *Back is bowed by the Quadratus.*

I for my Part would rather say it arises from the transverse Productions or Apophyses of the two lower *Vertebraes* of the Back and the last Rib, that it might together with the oblique descending Muscles and the straight ones, stir and move forwards the whol frame of the *Ossa Ilium*.

The Muscles of the Abdomen which serve for Inspiration or drawing in of the Air, do also further the bending of the Loyns and of the whol Back-bone; for whiles they bear down the Chest, they do withal bow the Back-bone: if lying along upon your Breech, you would lift up the Trunk of your Body; or would leap up upon your Feet, without the Assistance of your Hands.

The Loins are distended by four Muscles, on either side two, which are so infolded al along the Back-bone, that either we must make so many pares, as there are *Vertebraes*, or we must say there is only one Pare of Muscles distributing Tensions to al the *Vertebraes*, according to the Opinion of *Galen*. *Extenders.*

The *Semi-Spinatus* Muscle, takes a^b sinewy beginning, from al the Spines of the *Os Sacrum*, and ends into the transverse Apophyses of the Loyns and whol back. *Semispinatus.*

The *Musculus Sacer* with a^c pointed Flefhy beginning grows out of the hinder Part of *Os Sacrum* and terminates into the Roots of the Spiny points of the *Vertebrae* of the Back;

The *Spina* or *Loins* are laterally moved, when the *Muscles* on the contrary side do act by themselves, both the benders and extenders.

It the *Muscles* which extend the *Spina* or Back-bone, are opposite to the oblique *Muscles* of the Belly descendent and the straight ones, which move the frame of *Ossa Ilii*, they must needs grow out of the upper Parts of the Spine, that they may be inserted into the *Ossa Ilium* and *Os Sacrum*. And although they arise from the upper Parts of the *Spina*, they wil nevertheless serve to erect the *Spina*; and they wil be ever more *Antagonists* against the *Muscles* which bend the *Spina*, viz. The *Quadratus*, and the *Musculus Obliquus ascendens*.

For they receive Nerves, as wel in their upper as middle Parts.

T. 14. f. 2. O. O. f. 4. C. C. f. 1. N. N. ^b T. 14. f. 3. D. D. f. 4. A. A. ^c T. 14. f. 4. B. B. ^c

Chap. 33. Muscles of the Belly.

B Ecause those ^a ten *Muscles*, which are found displayed upon the Belly, were accurately described, At the beginning of the first Book, I wil not here repeat them, because they are excepted from this Discourse.

Chap. 34. Of the Motion of the Ilium Bones and Os Sacrum Joyned together.

T He frame of the *Ilium* Bones and *Os Sacrum* Joyned together, is moved backward and forward in the Genial Embracements tending to Procreation.

The laid Conjunction of bones is moved forwards by the ^b Right and Oblique ^c descending *Muscles* of the Belly, the Chest resting and the Thighs remaining unmoved, unless they follow the Motion of the *Ilium* Bones.

It is moved backwards by the *Musculus* ^a *Sacer* and the ^b *Semispinatus*, which arise from the upper Parts of the Back: which I have demonstrated by many reasons and experiments in my *Anthropographia*.

Chap. 35. Muscles of the Testicles.

They are Proper or Common.

Proper Muscle
of the Stones.
Cremaster.

T The Proper is that which is peculiar to each Testicle called ^c *Cremaster*. It grows out of the lower ^a fore Part of the spine of *Os Ilium*: or rather it is the sag-end of the Oblique ascending Muscle, bordering upon the *Os Pubis*, whole Flefhy is redder, thinner and as it were severed from the Flefhy of the said oblique ascendent Muscle. It infolds extrinsically the production of the *Peritoneum*, and is carried together with the Seminary Vessels unto the Testicle.

It draws the Testicle upwards and retains it suspended in that Posture.

The Common.
Dartos.

The Common Muscle is the Membrane of the *Scrotum* or Cod termed ^d *Dartos*, being a Continuation of the Flefhy Membrane. And this Musculous Membrane suspends both the Testicles.

Women have likewise their *Cremaster*, shorter than that of Men, Scituate upon the production of the *Peritoneum*.

Chap. 36. The Bladders Muscle.

Office of the
Sphincter of
the Bladder.

L Est the Urin collected in the Bladder should run out of it self against ones wil; there is a ^c round fleshy Muscle which being rould back over the *Prostata*, does shut

shut the bladders Neck; and being made broad it expels the Urin; and by wringing or squeezing the *Prostatas* or Auxiliary Testicles, it squirts out the Seed in Venereal Conflicts. Now the Neck of the Bladder being Fleshy, performs the office of an internal Sphincter Muscle, and exactly closes the Bladder.

^a T. 2. f. 8. A B. f. 9. A B. D. ^b T. 2. f. 9. B C. ^c T. 2. f. 8. A. &c. ^d

^a T. 14. f. 4. B B. ^b T. 14. f. 3. D D. f. 4. A A. ^c T. 6. f. 2. D D.

^d T. 6. f. 2. B B. ^e T. 6. f. 5. F F. ^f

Chap. 37. Muscles of the Yard.

THe Yard has four Muscles, two on each side.

Musculus ^a *Erector* is bred out of the innermore bunching out of the *Ischium*, and being knit unto the Ligament of the Yard, it reaches sidewaies as far as the middle of the Body thereof. The *Accelerator* takes his Rite not only from the *sphincter* of the *Anus* or Fundament, but also from the internal Tuberosity of the *Ischium* or Huckle-bone, and being with his Mate spred out under the *Vertebra* or Pils-pipe, it is drawn out as far as to the middle of the Yard.

It hastens the squirting out of the Seed, and forces out the drops of Urin, in the conclusion of Pissing. And because it is in its Original twofold, it may therefore be accounted a double Muscle; but because I attribute that portion which arises from the Tuberosity of the Huckle-bone, unto the Fundament, and call it *Levator externus Ani* [the external Arse-heaver] therefore the true *Accelerator*, according to mine, and other Anatomists Opinion, must arise only from the external Sphincter of the Fundament.

Chap. 38. Muscles of the Clitoris.

THe *Clitoris* in Women represents the Mans Yard, and therefore is furnished with Muscles alike, though not serving for the same of Office. Of which I have treated in my first Book, in the Chapter which describes the Womb.

^a T. 6. f. 1. a a. f. 5. H H. ^b T. 6. f. 1. b b. f. 5. II. ^c

Chap. 39. Muscles of the Fundament.

I Have described the Muscles of the Fundament very sufficiently in the 33. Chap. of my second Book.

Chap. 40. Muscles of the Thigh.

THe Thigh is extended, bended, drawn to a man, and from a Man, and obliquely wheeled about.

It is extended when we stand, our Thigh being Perpendicular to our Huckle-bone, which posture is caused by three Muscles which constitute the Buttocks, and are therefore by Authors termed *Musculi Gloutii*; that is the Buttock Muscles.

Maximus and *extimus* ^a *Gloutius*, the greatest and outmost buttock Muscle, is bred out of the spines of *Os Sacrum* and more than half of the *Ilium* Rib; and is inserted four Fingers beneath the great *Trochanter*, where a certain Eminence of the bone is discerned.

Secundus and *medius* ^b *Gloutius*, the second and middle buttock Muscle, springs out of the external Part of the *Os Ilium*, and is inserted into the great and external *Trochanter*.

G g

Tertius

Extenders of
the Thigh.

Medius

Minimus *Tertius* and *intimus* ^c *Gloutius*, the third and innermost buttock Muscle, arising from the outward and lower side of *Os Ilium*, is implanted into the Top of the great *Trochanter*.

Benders. The Thigh is bended by three Muscles.

Psoas.

Primus Lumbaris, The first Loyn Muscle called ^d *Psoas*, spread over the bodies of the Lumbal *Vertebrae*, in the Cavity of the belly; is bred out of the transverse Apophytes of the lower *Vertebrae* of the back, and being carryed along upon the inner surface of *Os Ilium*, it is inserted into the small *Trochanter*.

I have in Men, oftimes found a little Muscle spread over this, which in its original, being of the length and thickness of a Mans little Finger and fleshy, with a small and flat Tendon is carried above the *Psoas*, and when it is come to the *Iliac*, it looses it self into a broad and very strong *Aponeurosis*, which firmly combines the *Iliac* and *Psoas* Muscles. And therefore I conceive it is added, in strong Men, that it might straitly embrace the *Psoas* and hold it firmly in its seat.

It is called *Parvus Psoas*, and is more rarely found in Women than in Men: Howbeit in the year 1631. In a very stout *Virago* or kind of *Mol Cut-Purse*, it was my hap to see one of these Muscles, she having been hangd for Robberies and Murthers by her committed.

^a T. 23. f. 2. B. f. 3. A. ^b T. 23. f. 3. B. f. 4. C. ^c T. 23. f. 4. B. ^d T. 10. f. 1. O O. 1. 23. f. 1. A.

Iliacus.

Iliacus Musculus, the *Iliac* Muscle, takes its rise out of the ^a internal Cavity of *Os Ilium*, and being by its Tendon Joynd with the lumbal Muscle, it is terminated between the great and little *Trochanter*,

Pectineus.

^b *Pectineus Musculus*, The Conbe Muscle shootes out of the upper Part of *Os Pubis*, and is inserted a little below the Neck of the Thigh, on the foreshide.

Drawer to.

The Thigh is drawn to the inside by the *Musculus Triceps* or ^c three headed Muscle, which has three originals and as many distinct Insertions.

Triceps.

One of its Heads arises from the upper Part of the share bones or *Ossa Pubis*; the other arises from the middle of the said bones, and the third from the lowest Part of the said bones; and they are inserted into the hinder line of the Thigh, being disposed by courtes.

The Action of this Muscle is strong and *Prævalent*, drawing the Thighs inward, when we Climbe Trees, ascend to the Main mast and Ride on Hors back.

This trebble headed Muscle is the first that receives the Excrementitious Humors of the body which fall into Legs, because of the Vessels which pass that way.

withdrawrs.

The Thigh is drawn to the outside by very small Muscles, because the drawing of the Thigh outwards is not very necessary.

^a T. 23. f. 1. B. ^b T. 23. f. 1. C. below b. ^c T. 23. f. 1. and 2. C C.

The Quadrigeminals.

The *Musculi Quadrigemini*, are four little Muscles, interchangably placed upon the Articulation of the Thigh in the hinder Part thereof.

First

The first and ^a uppermost of the *Quadrigemini* being longer than the rest and as it were pear fashiond, is by others termed *Iliacus externus*. It arises from the lower and external Part of *Os Sacrum*.

Second

The ^b second of the *Quadrigemini*, arises from the Tuberosity or buncy Part of the Huckle-bone.

Third

The ^b third which is contiguous unto the former, arises from the same Part, and these three are inserted into the Cavity of the great *Trochanter*.

These three of the *Quadrigeminal* Muscles, being included in the Cavity of the great *Trochanter*, do serve likewise to thrust downwards or lengthen out the Thigh When it is stretched a little beyond its natural length, which you may observe in a Man that lies upon his Back, with his body and Leg stretched out.

They perform this Action in the same manner as the *Pterygoideus internus*, interposed between the two Jaws, does drive the lower Jaw forwards.

The Fourth.

The *Quartus Quadrigemini* ^c *Quadratus*, is broader and more fleshy than the other three, being distant from the third of the *Quadrigemini* two Fingers breadths;

breadths; and is propagated from the inner Part of the Protuberance of the Huckle-bone, and fastened into the external Part of the great Trochanter.

The Thigh is obliquely wheeled about by the two Obturators, the external and the internal.

The Internal ^d grows out of the inner Circumference of that hole which is in the Os Pubis or share bone; and being carryed along thorough that hollownes which is between the Knob of the Huckle-bone and its Acetabulum or Socket, it is by a tripartite Tendon inserted into the Cavity of the great Trochanter.

Its Tendon is folded up and inclosed by the second and third *Quadrigeminal* Muscles, which resemble a purse. Its action is to direct the external wheeling motion of the Thighs.

^a T. 23. f. 3. C. f. 4. D. ^b T. 23. f. 3. b. f. 4. G. ^c T. 23. f. 3. D. f. 4. E. ^d T. 23. f. 3. E. and 4. F.

The *Externus* ^a *Obturator*, taking its revolution from the external Circumference of that hole, which is in the share, and being Circumducted through the Neck of the Thigh as through a pully, it is carryed unto the Cavity of the great Trochanter under the fourth *Quadrigeminal* Muscle.

It governs the internal wheeling motion of the Thigh.

When the *Quadrigeminal* Muscles and the *Obturatores*, are soaked in Wheyish Humors, they cause most bitter pains, which counterfeit the true Sciatica, and lengthen the Thigh, as it it were half out of Joynt, which is diligently to be noted and distinguished.

Oblique wheelers.
Obturator internus.

Obturator externus.

Chap. 41. Muscles of the Leg.

The Leg is Joyned with the Thigh, by that kind of Articulation which is called *Gynglymus*, and therefore it is only moved by bending and extending; but because the Articulation is loose, it suffers a man to draw his Leg sidewaies; for which Cause *Laurentius* and other latter Anatomists, will have the Leg to be turnd inwards and outwards by certain Muscles ordained to that end.

It is drawn inwards or towards the other Leg, by the *Sutorius*, a very long Muscle. It is drawn outwards or from the other Leg, by a *Membranous* Muscle, or broad swath. I leave it free for any Man thus to divided the Muscles, which I distinguish into benders and extenders.

The Leg is bent by four binder Muscles.

The first of those four, is called ^b *Semi-Nervosus*, the Half sinnew Muscle. It arises from the Tuberosity or bunching Part of the Huckle; and ends in the hinder and inner Part of the Leg.

The other is termed ^c *Semi-Membranosus Musculus*, the Half Membranary Muscle, which proceeds from the same bunching Part of the Hip or Huckle-bone, with a beginning which is Nervous and *Membranous*; and with a larger Tendon, is inserted into the inner and hinder Part of the Leg.

^a T. 23. f. 4. e. ^b T. 23. f. 3. G G. ^c T. 23. f. 3. H H.

The Muscle ^a *Biceps* springs from the foresaid Tuberosity of the Hip or Huckle-bone, and being carryed along the outward Part of the Thigh, about the middle thereof it becomes fleshy, which fleshyness I have seen separated as a second Muscle, as far as the Head. It is by one only Tendon inserted, into the outward Part of the Leg.

The fourth being commonly termed *Posticus* ^b *Gracilis*, arises from that line which shews where the Hip-bone and the Share-bone grow together, and descending along the Inside of the Thigh, it is inserted into the inner Part of the Leg.

The Muscle called ^c *Popliteus*, is to be reckoned among the benders, it lies lurking in the Cavity of the Ham, above the Head of the *Soleum*. It arises out of the external swelling or bunching out of the Thigh, and is Obliquely inserted into the hinder and upper Part of the Leg, which it closely embraces.

The Motion of the Leg.

The Leg benders.
The Semi-Nervosus.

The Semi-Membranosus.

The Biceps

The Gracilis.

The Popliteus.

Extensors. The Leg is extended by six Muscles. The first we meet with is the ^d *Membranosus*, which is drawn out of the upper spine or sharp point of the *Ilium* bone and carried into the fore part of the Leg; or rather of the Thigh, and girts in the Muscles of the Leg it self, like a ^c *Membranous* swath, al save the *Musculus*
The Membranosus.
The Sutorius sutorius.

This Muscle taking its rise from the upper ^f Spine and fore Rib of the *Ilium*, and sliding down Obliquely by the inner Parts of the Thigh, ends into the inside of the Leg, which it is said to bring to and place over the other, as Tailors are wont to do when they would sit Cross-Leg'd.

Rectus gracilis. The *Rectus s Gracilis*, Springing out of the lower Spine of *Os Ilium*, and being carried right out al along the Thigh, ends on the fore Part of the Leg, beneath the *Epigonatis*.

Vastus externus. The two Muscles called *Vasti* do on either side border upon the *Rectus Gracilis*; the one of which being ^h *External*, arises out of the Root of the great Trochanter, and is inserted into the Leg, a little below the *Patella*, on the out-side.

^a T. 23. f. 3. III. ^b T. 23. f. 3. FF. ^c T. 23. f. 4. H. ^d T. 23. f. 2. FF. ^e T. 23. f. 1. GG.

Vastus internus The other which is ^a *internal*, arises from the Root of the smal Trochanter, and falls into the inside of the Leg, a little below the *Patella*.

Crureus. The Muscle termed ^b *Crureus* placed under the two *Musculi Vasti*, springs out of the fore bone of the Thigh, between the two Trochanters, and cleaving to the whol body of the Thigh, it produces its Tendon over the *Epigonatis*, unto the fore part of the Leg.

These five Muscles, the *Rectus*, the *Gracilis*, *Duo Vasti* and the *Crural* Muscle, being unired al together about the Knee, the produce one only Tendon, very broad and strong, wherewith the *Patella* is infolded.

Chap. 42. Muscles of the Feet.

Motion of the Foot. **A**s the Hand is divided into three Parts, so is the Foot into the *Tarsus*, *Metatarsus* and *Phalanx* or Row of Toes. And as in the Hand, the Wrist is moved while the Parts after the Wrist remain unmoved: so in the Foot, the *Tarsus* is moved, the *Metatarsus* remaining unmoved. And therefore the *Tarsus* is bowed, when it is moved forward, and it is extended, when it is forced backwards.

In the meane while you shal observe that the bowings of the Members in the whole Leg and Foot are contrary; in the hand they are like one another, for the conveniency of taking up of any thing; in the Leg and Foot they are contrary, to make us stand firme, and for the performance of different actions. For the flexion or bowing of the Thigh is performed forwards, the bowing of the Leg is performed backwards: the bowing of the Foot is done forwards, the bowing of the Toes of the Foot, backwards.

Foot-benders. The Foot is bowed by two Muscles seated before, which are called *Tibialis* and *Peroneus*.

Tibialis anticus. The *Tibialis c anticus*, taking its rise from the upper *Epiphysis* of the Leg neare the *Fibula*, and cleaving to the *Tibia* all along, about the middle of the bone, it degenerates into a Tendon, which beneath the ^d Ring-fashion'd Ligament of the Foot, is slit into two Tendons, the one of which is inserted into the *Os primum innominatum* or first namelets bone, and the other is lengthened out as far as to the Bone of the *Metatarsus* which is placed under the Great Toe.

^a T. 23. f. 1. HH. ^b T. 23. f. 1. Gc. ^c T. 23. f. 1. K. ^d T. 23. f. 1. L.

Peroneus anticus. The *Peroneus a Anticus* is in its Original joyned to the *Peroneus Posticus*, although both the Tendons are drawn through the cleft of the external Ankle, yet in their end and insertion they are separated. The *Anticus* has its rise from the middle and

and external part of the *Perone*, and being led through the cleft of *Malleolus externus*, it is inserted on the soleside into the bone of the *Metatarsus*, which sustains the little Toe.

The Foot is extended by the after-Muscles. The first and outmost are the *Extenders*:
^b *Gemelli* or *twins*, so called because they are equal in Bulk, Strength and Action. They are also termed *Gastrocnemij*, because they make the Belly or swelling of the Calf of the Leg: and the one of them is *internal*, placed in the inner side of the Tibia or Shank, the other is *external*, and possesses the outside thereof.

The internal *Twin-Muscle* arises from the inner knob of the Thigh; the *external* *Twin-Muscle* arises from the external knob of the said Thigh. They are severed in their beginning, but grow together at last into one Belly, which by a strong Tendon is lengthened out unto the hinder part of the Heel. *Vesalius* was the first that observed that. To several beginnings of every one of them, there are several little Bones placed like unto Sesamine Seeds or like Tares or Vetches, to the end that with their smooth and slippery surface, being placed between the Muscles and the Bones, they may hinder the Muscles from being hurt, when the leg is turned this way or that way.

Plantaris ^d *Musculus*, which lurks between the *Twins* and the *Soleus*, arises from the external knob of the thigh, being fleshy on the upper part, and quickly ending into a very small and longish tendon, it is drawn under the Heel, by the inner Ankle-bone, and diffused into the sole of the Foot.

It performs the same office in the Foot as in the hand; that the Foot might answer to the hand, and that whilst the Foot is hollowed, the Skin, by the Tendons lying under, might be firmly fastened.

^a T. 23. f. 1. LL. ^b T. 23. f. 1. d d. f. 2. D D. f. 3. K K. ^c T. 23. f. 3. o o. ^d T. 23. f. 3. M.

The *Soleus*, a broad and thick Muscle, takes its original from the upper part of the Leg, or from the upper and hinder closure of the *Tibia* and *Perone*; and is inserted by a tendon mixed with the *Gemelli* or *Twins*, into the hinder part of the Heel.

Under the Muscle *Soleus* remarkable vessels have their passage, both Veins, and Arteries and Nerves: whence it comes to pass that the pains of the Calf of the Leg are deep and lasting.

Of the *Twins* and the *Soleus* mingled together in their inferior parts, is made that same common Tendon, which is so exceeding thick and strong, which *Hippocrates* terms the *Chorda magna*, the Hurts, Bruises and wounds whereof, do cause death.

The foot is extended by two hinder Muscles, the *Tibialis posticus* and the *Peroneus posticus*.

The *Tibialis posticus* does arise from the upper part of the Tibia, and being affixed to the whole bodie thereof, through the cleft of the inner Ankle bone, it produces two Tendons, the one of which ends at the Scaphoidean Bone, and the other is carried as far as to the primum *Os innominatum*.

The *Peroneus* ^c *Posticus*, does arise from the upper and hinder part of the *Perone*, And being carried with the *Peroneus anticus* through the cleft of the external ankle bone into the bone of the *Metatarsus*, which sustains the greater toe, under the sole of the Foot, it transmits its broad, hard and gristly kind of Tendon, under the Tendinous head, of that Mass of flesh, which does produce its internal inter-osses.

The Muscles *Peroneus anticus* and *Posticus*, as they are distinct in their original, so are they also distinct in their insertion, although they are drawn through the pulley of the external ankle: but the Tendon of the other *Peroneus Flexor*, is inserted into the outside of the *Os metatarsi* which sustains the little Finger.

The Tendon of the other *Peronean* Muscle, whose office is to extend the part, begin

being scituate behind, is carryed further and more inwardly, under the Muscle called *Pedius*. These two tendons are separated one from another, being inclosed in two distinct sheaths or scabbards, of a nerve-gristly substance.

^a T. 23. f. 3. f. 3. LL. ^b f. 2. EE. ^c f. 23. f. 2. FF. ^d

Chap. 43. Muscles of the toes.

*The Annular
Ligament.*

THe Toes have their proper Muscles; fitted to procure their bending, extending, and lateral motion from one side to another: also their tendons are comprehended within a Ring-fashioned or *circular and transverse* ^a ligament, which does encompass them beneath the Ankles, just as we see in the Wrist.

Toe-stretchers.

They are extended by the *Musculus longus* and *Brevis*.

cnimodactylius

The *longus*, or ^b long-Toe-stretcher called in Greek *Cnimodactylius*, takes its rise from the fore and inner side of the *Tibia*, there where it is joined to the *Fibula*, lurking close under the *Tibius anticus*, and goes down-right all along the *Fibula*, till having passed the Ring-fashioned ligament, it ends into the three Articulations of the ^c foure Toes that it might at once and by one motion, move the three joyntings of the foure Toes aforesaid.

Pedians.

Brevis Digitum tensor, or the ^d short Toe-stretcher, or *Pedian* Muscle, springs out of the Heel and the external and upper part of the neighboring *Astragalus* or bone so called, and being spread under the Superior, it is with its tendons inserted into all the Joynts of the Articulation.

The Tendons of these Muscles, as well the long as short, do pass cross-wise one over another, above the *Metatarsus*.

The Toe-benders.

The Toes are bowed by two Muscles the *Brevis* and *Longus*, which answer to these Muscles of the hand which are called *Profundus* and *Sublimis*.

Perodactyleus.

Longus ^e *Digitum flexor* the Long Toe-stretcher called also *Perodactyleus*, arises out of the hinder and upper part of the *Perone* or *Fibula*, and being carryed along under the inner ankle, through a peculiar cavity of the Heel, it is divided into foure tendons, which are drawne through the flits of the short Toe-bending Tendon (as we see likewise in the Hand) and then inserted into the third Joynt of foure Toes.

^a T. 23. f. 1. g. ^b T. 23. f. 1. MM. ^c T. 23. f. 1. ff. ^d T. 23. f. 2. G. ^e T. 23. f. 4. ll. f. 6. C.

*Pedius
internus.*

Brevis ^a *Digitum flexor*, or the *Pedius internus*, or short Toe-Bender, springs from the inner and nether part of the Heel, and being parted into foure, it is terminated into the second Articulation of the Toes.

The Tendons of this Muscle have holes bored in them for the Long Toe-benders Tendon to pass through.

*The oblique
movers.*

Moreover, the Toes are drawn sidewaies by the Interossean Muscles. They are eight in number, foure internal and as many external, which are otherwise disposed in the foote than they are in the hand.

*The Inter-
osseans.*

The external arise from the spaces of the Bones of *Metatarsus*: the internal, being scituate in the ^c Hollow of the foote, and knit unto the bones, and seeme to take their original from that lump of ^d Flesh, which possesses and fills up that same Cavity of the Bones of the *Metatarsus*: but the membrane being taken away, they are seene to arise from one nervous pointed or acuminate Original, fixed on the inside neare the Heele, and divided into four tendons, and to end into the second Articulation, whereunto the worme-fashion'd or lumbrical Muscles do cleave.

And therefore the external inter-ossean Muscles, doe fill up the empty spaces of the Bones of *Metatarsus*.

The Lumbrical or worm-fashion'd ^e Muscles, do not arise from the tendons of the long Toe-bender, as in the Hand, but from a fleshy lump, which lies hid underneath the short Toe-bender; and that has its original from the Heel.

Chap. 44. Muscles of the Great Toe.

THe great Toe^f Bender, being scituate neare the long Toe stretcher, and of a fleshy substance, arises out of the upper Part of the fibula, where it is joyned with the Tibia, and passing along under the inner Ankle bone and the Sole of the Foote, it is inserted into the first bone of the Great Toe: and before it comes unto the second bone a little Sesamoidean Bone is preposed; and the Tendon for securities sake is intercepted, with two greater Sesamoidean Bones.

The great toe-bender.

^a T. 23. f. 4. L. f. 6. A. ^b T. 23 f 2. a a a a. ^c T. 23. f. 5. d d d d. f. 6. f f f f. ^d T. 23. f. 6. DD. ^e T. 23. f. 6. e e e e. ^f T. 23. f. 4. K. f. 6. B.

Sometimes under the sole of the Foot it is divided into two Tendons, the one of which is transmitted to the great Toe, the other to the second of the little Toes; and then the great Toe-bender is divided only into three.

Extensor^a Pollicis the great Toe-stretcher, arises from the external side of the Tibia, where it is separate from the Fibula and creeping along the surface of the Foote, it is inserted into the whole great Toe, in its upper side. The other ends into the Bone of Metatarsus, which is spread beneath the great Toe.

The Stretcher.

The great Toe and the little Toe, have two notable Muscles, externally scituate, which draw these Toes outwards from the rest; so that one of them, being externally fastened unto the bone of the Metatarsus, which is placed under the great Toe, is termed Abductor^b Policis, the Drawer aside of the great Toe.

The Abductor,

The other being externally spread upon the first Bone of Metatarsus, may be called Abductor^c minimi digiti, the drawer aside of the little Finger. It answers to the Thenar and Hypothenar of the Hand.

The little Toes Abductor.

Furthermore the Great Toe has in the sole of the Foot another Transverse^d Muscle, like the Anti-thenar, which arising out of the Ligament of that Bone of the Metatarsus which is placed under the least or next Toe, and going obliquely upon the other Bones, it ends with a strong Tendon into the first Joynt of the great Toe, beneath the same.

The great toes drawer to,

This Muscle is opposed to to the Abductor, that it might draw the great Toe back againe.

The flesh being taken away, we find a threefold or fourfold Membrane, I suppose it is that Mass of flesh which fills the Cavity of the sole of the foot.

^a T. 23. f. 1. N. ^b T. 23. f. 3. O. f. 5. b b ^c T. 23. f. 3. P. f. 5 c. ^d T. 23. f. 5. a.

In the lowest part of the Foote which is termed Vestigium, there is contained a Lump of flesh which fills up the Cavity and empty space of the first Joynts: from whence writers say Tendons are drawn to the several Toes.

The Mass^d of Carnea.

I conceive the use of this flesh is rather to strengthen the Toes and to combine their first Articulations, than to move the same, also like a soft Cushion, it is spread under the Tendons of other Muscles.

Its Use.

Chap. 45. An Introduction to the Art of Muscular-Dissection, shewing an Accurate Method to cut up the Muscles of the whol Body.

Whosoever has perfectly learned the History of the Muscles, will easily understand the Art of their Dissection, and be able of himself without any help, to administer this part of Anatomical section, which many account the hardest of all, provided he diligently observe the Method which I here deliver. And therefore having finished our Myologia or History of Muscles, Myotome or the Art of their Dissection, will seasonably follow.

The Method

The

*The Frontal Muscle.**The frontal Muscle.*

The Skin of the forehead, being circulary cut off above the Eye-brows and drawn away as far as to the Coronal Suture, or to the beginning of the Haires, you meet with the two frontal Muscles, which are most exactly to be separated from the frontal or forehead bone which lies beneath, beginning from above and cutting all away into the very Eye-browes. They are in the middle of the Forehead distinct one from another.

^a T. 23. f. 6. *DD.* ^b T. 15. f. 1. *E.*

*The Orbicular Muscle of the Eye-Lids.**The Orbicularis.*

The Skin of the Eye-Browes and of the whole face being industriously dissected, there appears a double^a orbicular Muscle, which does circularly cover the socket of the Eye a Fingers-breadth on all sides, and is spread under each Eye-lid. Also, you shall find the *Musculus Ciliaris*, stretched out orbicularly under the Tarsus.

*The Ciliaris.**Muscles of the Lips.**Zygomaticus.*

Afterwards, the whole Face being made bare and the Skin fleed off, a little below the Eye-hole, we meet with a little lean longish Muscle, placed athwart and called^c *Zygomaticus*. For it is produced from the Zygoma unto the opening of the Lips. This Muscle must be separated from the Fat; for much Fat (which is also crowded into the Muscles) does cover the whole face, which you shall pluck away with your nails or with a paire of piners, or with a very sharp pen-knife, that the Musculous flesh may more evidently be distinguished.

Lip-lifters.

From the Zygoma towards the Lips, you shall search for *five* Muscles besides the Zygomatick muscle: and you shall find two above the upper Lip; each of which is exactly to be separated from the other. That Muscle which is neereft the Zygoma, belongs unto the neather Lip, which is lifted up thereby. The other being very neare to the^e Nostrils, is reckoned to belong to the upper Lip. The *lateral*^f Muscle broad and Flethy which opens and forms the Cheeks, and therefore is called *Bucco*, must not be stirred out of its place.

*Buccinator.**Lip-depressers.*

In the neather jaw, as far as to the middle of the lower Lip, you shall search for two Muscles, having first taken away the skin.

^a T. 15. f. 1. *FF.* ^b T. 19. f. 1. *CC.* ^c T. 15. f. 1. *L.* ^d T. 15. f. 1. *K.*
^e T. 15. f. 1. *H.* ^f T. 15. f. 1. *O.*

That^a which is neereft the Chin, does depress the lower Lip. That which lies^b beyond next the Masseter or fastend to the Corner of the mouth, drawes the upper Lip downwards. These two Muscles, though most exactly united, are yet distinguished one from another by the various posture of their fibres; namely, in as much as the Fibres of the former Muscle, do seeme to go upwards from the Chin to the Lip, and do as it were constitute a pyramidal Muscle, whose Basis rests beneath and its top reaches to the Lip: the Fibres of the other Muscles do ascend unto the Meeting of the Lips.

*Muscles of the Nose.**Nose-lifters.*

The Skin of the Nose being curiously taken away, two Muscles discover themselves being fastened unto the bones and laps of the Nostrils, which arising out of the space between the Eye-Browes, are carried into the laps of the Nostrills.

Nostril-wideners.

Other Anatomists ad (but only in such as have great Noses) two little^d Muscles spread athwart upon the ends of the Nose laps, which widen the Nostrils, as the former do lift them up.

Other Anatomists ad (but only in such as have great Noses) two little ^d Muscles Nostril widners spread athwart upon the Ends of the Nose-Laps, which widen the Nostrils, as the former do lift them up.

In the Interim you shal observe, that all these Muscles are so strictly conjoined, that one of the Lips, or the Nose cannot be moved without the motion of the Neighboring parts.

The internal Muscles of the Nostrils are seldome found, and only in such as have jolly roating Noses.

The Temporal Muscle.

That same thick and fibrous Flesh which is situat between the smaller Corner ^{Temporalis.} of the Eye and the Ear, is called the ^e Temporal Muscle; whose tendon being drawn along under the Zygoma, is ^f terminated into the Top of the lower Jaw.

^a T. 15. f. 1. n. ^b T. 15. f. 1. M. ^c T. 15. f. 1. G. ^d T. 15. f. 1. I. ^e T. 15. f. 1. P P. f. 2. A A. ^f T. 15. f. 2. a a.

The Masseter Muscle.

From the lower part of the Zygoma, arises the Muscle ^a Masseter, which makes ^{Masseter} up the fleshy sides of the Face. It is inserted into the Corner of the Lower Jaw; and it may be divided into two, the internal and external fibres being cross-waies intersected.

The Parotick Kernels.

Above the Joynt of the lower Jaw, behind the Ears, there are scattered certain ^{Constitution of the Parotis.} Kernels, of which one great kernel is made, called *Parotis*. this cannot be seen unless the broad Muscle, which reaches unto the Eare, be torn away. This Kernel being plucked out, you may proceed to the Muscles of the Eares.

The Muscles of the Eares.

Although the Eares in Man-kind remaine firme and immoveable, yet have they their ^b proper muscle placed behind them. The first is a very litle one, divided into two or three fleshy fibres, very friendly imbracing the ligament of the Earth. you must search for it at the root of the Ear.

The other Muscles of the Eare, are only portions of the frontal muscle, the broad Muscle, and the Hinder-Head Muscle; all which are bred out of the fleshy pannicle.

The Muscles of the Eye.

Within the Eye-hole are contained seven Muscles, such as are the *Attollens Pal-* ^{The Eye-lid-} *pebram* the Eye-lid lifter, Four straight ones and two oblique. Six of these arise ^{lifter} out of the deepeest part of the Eye-hole;

^a T. 15. f. 1. S. f. 2. B B. ^b T. 15. f. 1. Q. R. T. 20. f. 1. H I. &c.

You shall find two above the globe of the Eye, of which the one being first in si- ^{Four right mus-} ^{cles of the} ^{Eye.} tuation, is the ^a Lifter-up of the upper Eye-lid; and the other is called *Attollens* ^b *Oculi* the Eye-Lifter. You shal search for three other ^c streight Muscles, every one in its situation suitable to the action which it is to perform.

But you shall diligently observe the sixth ^d large oblique Muscle, which at the ^{Obliquus major} great corner of the Eye, or by the space betweene the Eye-browes above the Teare-pipe or *foramen lachrymale*, runs back about the Cartilage or Gristle, as about a pulley, or as a bridle about the Annulary or ring-fashioned ligament.

Be very careful that you do not break this Conjunction. For which cause you shall begin your Anatomical administration of the Eye, in that place; that is to say from the greater corner of the Eye, that you may preserve entire the ^e Pulley and the

Insertion of the Tendon, which is inclosed within a small nervous Ligament which receives the Tendon it self, and accompanies the same unto the Eye. The flesh of that muscle is fixed to the boney sides of the Eye-Hole at the greater corner.

*Obliquus
not.*

The *septimus Musculus Obliquus minor*, seventh Muscle, being the lesser of the crooked ones, is bred out of the inside of the lower part of the Eye-hole, near the Tear & Kernel, and taking its revolution above the *Muscle Humilis*, but below the *Indignatorius*: it is terminated aloft upon the Globe of the Eye, by the Muscle called *superbus*.

In the Anatomical Dissection of the Eye, this Muscle is to be lookt after in the second Place, and to be warily preserved, least we teare it in peices, while we seek for the rest.

If with the point of your Pen-knife you pluck back the Coat of the Eye called *Conjunctiva*, you shall see that *all the Muscles of the Eye*, do Terminate by a fine Membranous Aponeurosis (conjunction or Contexture of many Nerves) into the *Tunica Cornea*. But they do not make a peculiar Membrane, as *Columbus* imagined, because the Aponeurosis (nervy contexture) of every Muscle, is distinct by it self.

^a T. 19. f. 1. A A. ^b f. 3. 4. 5. A. ^c f. 3. 4. 5. B. C. D. ^d f. 3. and 4. F. ^e f. 3. and 4. G. ^f f. 3. and 4. E. ^g f. 1. D. ^h f. 3. 4. and B. ⁱ f. E. 4. and D. ^k f. 3. 4. G. A.

But you cannot see or demonstrate the Muscles of the Eye, unless with a pair of Scissers you take away the fat placed about them; and after that you have shewn the Muscle which is the Up-lifter of the upper Eye-lid, with the four streight Muscles and the little crooked one.

That you may plainly discover the *Obliquus Major* or greater Crooked Muscle, with its revolution to the pulley, you shall take out the Eye, leaving that greater oblick Muscle, but cutting the rest away with your scissers.

Muscles seated in the Neck.

The Neck, which we make account reaches from the Basis of the Head unto the shoulder-blades, comprehending seven Ipondyls or Vertebra's, has divers Muscles in its fore side; of which some appertain unto the Head, to the *Os hyoides*, some to the *Larynx*, others to the tongue, and others to the *Pharynx*.

Latus.

And first we met with the *Musculus latus*, the broad Muscle, which infolds the whol Neck. It breeds out of the Clavicula and Brest-bone, and being fastened to the Basis of the neather Jaw, it is laterally carryed forth unto the Eare; it must be very exactly separated from the Fleahy parts which lie beneath it, because it is an exceeding thin Muscle.

The *Musculus Latus* being revelled or drawn back, in the fore part of the Neck under the Chin you shal find nine as far as to the *Larynx*, and beneath the *Larynx* six.

Mastoidens.

Towards the outward part of the Neck, there appears the thick and round Muscle *Mastoidens*, which ascends slanting from the Clavicula to the Mastoides. this Muscle ought to be separated at its original, that the others may be seene. But observe, by the way, that this Muscle is very often broken asunder by the Halter in such as have bin hanged.

Coracohyoideus.

Under the *Mastoidens* there lies lurking the *Coraco-hyoideus*, a lean and longish Muscle; oblickly stretched out from the *Scapula*, to the *Os Hyoides*, for the retraction whereof, it is ordained.

^a T. 15. f. 2. F. T. 15. f. f. 1. g g. ^b T. 14. f. K K. f. 3. G. ^c T. 13. f. 13. F. ^d F.

Then you shall see afterwarde the *Carotick Arterie*, and the *internal Jugular Veine*, and the *Nerve of the sixth Conjugation*, interposed betweene the said two Vessells. And then you shal pass unto the Muscles seated beneath the *Larynx*.

The first which presents it self is the *Sternohyoideus*, which is bred out of the top of the sternum or Brest-bone. Under this lies the *Bronchius* which belongs to the *Larynx*. Then

Then you shall dissect and shew the Muscles placed above the Larynx and under the Chin.

The first is *Digastricus maxilla interna*, or the *Two-bellied Muscle of the lower Jaw*, which is sinall and nervie in the middest thereof, that it might be turned back about the *Stylo-cerato-ides*, and ends into the Chin, inwardly.

There are two *Glandules* or *kernells* under the Chin neare neighbors to this Muscle, which in rheumatick defluxions do often swell. They are termed by *Vesalius*, I know not why, *Animella*. You must remove these *Glandules* that the rest of the Muscles may be discovered, also you must separate the *Digastric* or *Two-belly* from the Chin.

Under it lies the Muscle *Mylohyo-ideus* with his Mate most straightly tyed and united, but a line drawn from the notch of the Chin as far as to the middle of *Os Hyoides* within, will shew you how to dissect.

Under this *Mylo-hyo-ideus* are found two remarkable Nerves, Branches of the Seventh Pair, and the Muscle *Genio-Hyo-ideus*, rising from the inside of the Chin and ending into the *Os Hyoides*, but so closely lunkt with his Mate, that it is distinguished no otherwise, than by a white line which is manifest within.

Under these lurks the *Genio-Glossus*, by the outer side whereof lies the *Melo-glossus*: under which lies the *Cerato-glossus*, or rather *Basiglossus*.

T. 13. f. 13. DD. T. 13. f. 5. CC. T. 15. f. 1. TT. f. 2. CC. T. 13. f. 14. EE. T. 13. f. 13. BB. T. 23. f. 13. CC. T. 13. f. 14. CC.

Afterward you shall come unto the hollow of the Neck under the lower corner of the Jaw, where the Kernel was scituate, which was formerly taken out. In this place is found the *Stylo-glossus*, which is inserted into the *Ceratoglossus*.

Beneath there appear two Muscles, the one of which being lean and altogether fleshy, is called *Stylo-hyo-ideus*, the other which is next unto it and touches it, being fleshy in its original at the *Styloides Proceß*, and small as a string in its middle, is called *Digastricus* or *Two-belly*. The first was observed in the Neck under the Chin.

Under the *Stylo-glossus*, lies sculking the *Stylo-Pharyngeus*. Under the corner of the lower Jaw-bone, there is internally and immediately fastened the *Pterygo-ideus internus*; which takeing its rise from the Cavity of the *Pterygoides*, ends into the Corner of the lower jaw, on the inside. You must not remove it from its posture.

From the Basis of *Os Hyo-ides* on the outside, presents it self the short Muscle *Hyo-thyro-ideus*, which is inserted into the middle of the *Thyroides*. This whole Muscle, is commonly found broken by the Haltar, in such as have been hanged.

All these Muscles having been shewed and taken away, there appears the *Oesophagus*, a broad and Membranous Muscle spread under the *Oesophagus*, which it embraces, and is externally terminated in the Wings or Skirts of the *Cartilago Thyroides*, or Gristle so called.

Muscles of the Larynx, Pharynx and Gargareon.

The *Oesophagus* being shewed and separated, take away the whole Larynx: that you may see those little Muscles which are proper to it. You shall observe eight or ten of them, of which some are ordained to move the *Thyroides*, and others pertain to the *Arytanoides*.

In the formost and lowest part of the *Thyroides*, are placed the two Muscles called *Crico-arytano-idei antici*.

T. 13. f. 14. DD. T. 15. f. 1. TT. T. 3. f. 2. and 3. CC. T. 15. f. 2. DD. T. 13. f. 8. BB. T. 3. f. 2. and 3. DD. T. 13. f. 8. DD.

By the sides and lower Corners of *Thyroides* are situate the Muscles called *Crico-arytano-idei Laterales*. In the hindermore and outward side of the *Cricoides*

Thyroides
Arytenoides.

coides, you shall find the two Muscles called *Cricothyroides*. Having separated the Thyroides, inwardly and towards one side, you shall see the Muscle *Tyroarytenoides*. To these is added the ^d circular Muscle infolding the whole Arytenoides.

But all these Muscles cannot be seen unless the *Oesophagus* be taken away, and the ^e *Parathyroid* Kernels pluckt off, with which the Cartilage Thyroides or Gristle so called, is covered.

The *Epiglottis* ^f in Mankind, has no Muscle; in Brutes, two pretty ones are found, which you may see in the Larynx of an Ox. But in Mankind, we find only a sinewy Ligament, which keeps the Epiglottis continually erected, unless it be depressed with the weight of the Nutrient passing by.

The Pharyn-
gei.

Afterwards you shall search for two other Muscles of the Pharynx, viz. the ^g *Sphenopharyngeus* and ^h *Cephalopharyngeus*.

And then you may easily find the other two ⁱ Muscles of the Gargarreon, if you have learned their Originals and Insertions out of the *History of the Muscles*.

The Muscles of the hinder-part of the Head and Neck.

Trapezius.

The Skin being removed, and the Fat of the hinder part of the Neck and of the whole back as far as Os sacrum being pluckt away, you shall observe many Muscles; the first of which is called *Trapezius* or *Scapularis*, which with the *Latissimus* does cover the Neck, Back and Loynes, as it were a cloak.

Now the *Scapular* ^k Muscle, which belongs unto the shoulder, its broad end reaching out as far as the Occiput or Hind-part of the Head, does compass all the Muscles of the Neck, and must in the lower part thereof be separated from the ⁱ *Latissimus Musculus*, and wholly plucked up from the roots of the Spines or pointed Bones of the whole Back-bone as far as to the hinder part of the Head, from which it must be separated, and only left sticking to the shoulder-blade.

^a F. 13. f. 9. CC. ^b f. 10. CC. ^c f. 9. BB. ^d f. 10. BB. ^e f. 16. & 17. ^f f. 7. 9. & 10. A. ^g T. 3. f. 2. & 3. BB. ^h f. 2. & 3. AA. ⁱ T. 13. f. 15. BB. CC. ^k T. 14. f. 1. & 2. AA. f. 2. AA. I. f. 1. CC.

Rhomboides.
Serratus
minor.

This Muscle being taken away, the ^a *Rhomboides* a Muscle of the Shoulder-blade, must be cut from the spines of the Backbone. Under these lies the ^b *Serratus Supernus minor posticus*, the upper and smaller Saw-Muscle situate behind.

The Splenius.

These Muscles being plucked away as far as to their Intertion, the Muscles of the Head do shew themselves. And the first that occurs is the ^c *Splenius*.

Levator
scapulae.

Neare unto which is placed on the side of the Neck, *Levator* ^d *proprius Scapulae* or the Muscle appropriated to pluck up the shoulder; whose original cannot be discovered, unless the *Mastoides* having been shewed, be taken out of the way.

Complexus.

The *Splenius Musculus*, towards the Roots of the spines of the Neck, being taken away, there lies under it the ^e *Complexus*, neare unto which at the side of the Neck, lie certain portions of *Musculus Spinatus*, and the *Sacro-lumbus* arising as high as the second Vertebra of the Neck.

Transversarius

The *Complexus* being taken away, below the second Vertebra of the Neck, are seen two Muscles which owe their service to the Neck. The first of these is ^f *Transversarius*, inter-posed between the transverse and Spine Apophyses of the Neck and Back.

Semispinatus.

Under this is spread the ^g *Semispinatus* immediately covering the Bodies of the Vertebra's.

Obliquus
major.

Upon the first and second Vertebrae of the Neck, are seen eight small Muscles, in each side four, of which the two Greater ^h *Oblique* Muscles, are carried from the transverse Apophysis of the second Vertebra, to the transverse one of the first. The two ⁱ *Recti Majores*, do begin at the Spina of the second Vertebra, and end into the Occiput.

Rectus minor.

Under their upper ends are situate the two *Musculi minores*, or lesser Muscles, the

the Streight and the Crooked, or the *Rectus* and *Obliquus*. The^k *Minor Rectus* lies hid under the Major *Rectus*, which you shal unloose at the Head and pluck it aside, that the *minor Rectus* may appeare.

^a T. 14. f. 1. BB. f. 2. B. C. ^b f. 2. E. ^c f. 2. HH ^d f. 2. DD ^e f. 2. II. f. 3. EF. ^f f. 4. EE. ^g f. 4. DD. ^h f. 2. L. f. 4. GG. ⁱ f. 3. & 4. II. ^k f. 3. 1. f. 4. KK. ^l

The Muscle called *Obliquus a minor*, is carryed from the Hinderpart of the Head by the *Minor Rectus*, into the Transverse Apophysis of the first Vertebra: But you must free and lay bare of fat these Muscles, as wel the streight as the Oblique or crooked ones, that they may be the more apparently seen. And you shal begin your Section of the Muscles of the Head and Neck at the respective Spines or pointed Eminencies of the Back-bone.

Obliquus minor.

When you have viewed the Muscles aforesaid you shal then make diligent search after one that lies closely sculking, above the Articulation of the inferior jaw and under the Zygoma; it is situate upon the external wing or Lap of the *Pterygoides*, and being altogether fleshy and round in a manner, it is inserted into that same slit which is interposed between the Coronis and the knob of the Lower Jaw bone.

It may be termed the *Pterygoideus Externus* to difference it from the *Internus* described before.

Pterygoideus externus.

Muscles of the Arme.

These Muscles being administred, you may proceed to others. And first you shal separate the ^c *Pectoral Muscle* either from the Brest-bone, or from its lowest part, by which it is joined to the *Serratus Major*.

The pectoral muscle.

Meane while observe that the *Serratus Minor* or ^d *Smaller Saw-Muscle*, lies under the *Pectoral* or Ribs: least you should teare the same, whiles you dissect the *pectoral Muscle*, which you must cut up, as far as to the middle of *Clavicula*. To which place being come, you shal separate it from the *Deltoides* or *Delta-shaped Muscle*, unto which it is fastened by a firme, but obscure band. Then you shal separate the *Delto-ides* from its original.

Serratus minor

From thence you shal proceed to the Muscles which are spread out upon the shoulder-blade. One lies upon the Spina or Back-Bone, three are seated beneath the same. That which is Next the Spina, is called ^e *Infra-Spinatus*.

Infra-spinatus.

Next thereunto, is the *Rotundus f Minor*.

^a T. 14. f. 3. K. f. 4. HH. ^b T. 15. f. 2. EEE. ^c T. 10. f. 1. A. B. T. 22. f. 1. E. ^d T. 10. f. 1. E. ^e T. 22. f. 3. BB. ^f T. 22. f. 1. & 3. C. ^g

Beneath that, you find the ^a *Rotundus major*, stretched out beneath the lower Rib of the *Omo-plata* or shoulder-blade.

Rotundus major.

Under the scapula you shal find the Muscle called *Immersus* or ^b *Subscapularis*: it fills the Hollow of the Shoulder-Blade.

Rotundus Immersus.

You shal leave the Original and Insertions of those Muscles untouched, only you must separate the sides of one Muscle from another, that they may be distinguished asunder, one from another.

Muscles situate upon the Back and Loines.

From the *Omo-plata* or shoulder-blade, descend unto the Back & loins; which parts are covered with a Muscle called *Amplissimus* and *Latissimus*, or the ^c *Largest and broadest Muscle*. This Muscle must be separated from the Os Sacrum and the external Rib of Os Ilium, as far as to the lower Angle or Corner of the shoulder-blade, and its insertion at the Os Brachij a little beneath the Neck.

Latissimus.

You must while you cut it up at the Spines of the Vertebra's, take heed of spoiling a Muscle which lies beneath it, and is termed *Serratus d posticus infernus*, the *Hinder and lower Saw-Muscle*, being a little one.

Serratus posticus.

Which

Which after you have pluckt off, from its original by the Os sacrum, as far as its Insertion, you shall shew three other Muscles, stretched out from the Os sacrum, all along the Spina or Back-bone.

Sacro-lumbus.

Of which the first being lateral and seated towards the Ribs, is called *Sacro-Lumbus*. You shall begin your dissection of this Muscle at the upper part by the Root of the Ribs. A white line of fat wil guide you from the top to the bottome, where you may separate it from the *Musculus quadratus* which belongs unto the Loins, but in its original it is exceeding hardly separated from the *Spinatus*.

Quadratus.

Note by the way that the *Sacro-lumbus* does reach as far as the Hinder part of the Head, and that it does bestow a double Tendon upon every Rib.

^a T. 22. f. 1. and 3. D. ^b T. 22. f. 1. B. ^c T. 14. f. 1. C C. D D. T. 22. f. 1. F. ^d T. 14. f. 2. F. G. ^e T. 14. f. 1. L L. f. 3. B B. ^f T. 14. f. 2. O O. ^g

Spinatus.

Sacer.

Now you shal separate the *Spinatus* from Os sacrum, by easily and gingerly taking away the hard Aponeurosis which is spread out over the *Musculus sacer*; which being taken off, if you lengthen out your section above, you wil discerne the difference between the *Spinatus* and the *Sacer*.

Which when you have attained, thrusting your pen-knife streight in, as far as to the transverse Apophyses, you will easily separate those Muscles.

The *Spinatus*, goes as high as the second Vertebra of the Neck, being in the middest between the Transversarius and the Complexus.

The *Spinatus* being fastened to the transverse Apophyses, does also arise as far as the Neck.

Muscles of the Breast.

Serratus major

The Bodie being turned and laid with the face upwards, you shall sever the *Serratus Major* laterally, and putting in your hand underneath, you shal find it stretched out under the Omoplatea or shoulder-blade as far as to the Clavicula. And then you shall see the *Muscle subclavius* placed between the Clavis and the first Rib.

Subclavius.

Triangularis.

You shall look for the *Pectoral Muscle internal* or the *Triangular Muscle*, in the inner part of the Breast-bone pluckt off. Afterwards you shal carefully and gingerly separate the *external intercostal Muscle* from the *internal*. The fibres Cross-waies interposed, will distinguish the one from the other.

Intercostalis.

^a T. 14. f. 3. D D. f. 4. A. ^b T. 14. f. 4. B B. ^c T. 10. f. 1. C D. ^d T. 10 f. 1. F. ^e T. 10. f. 1. G G. ^f T. 10. f. 1. H H. ^g

Muscles of the Cubit.

When this is done, you shall returne unto the Arme to make observation of the Muscles of the Cubit, which are seated in the Arme.

Five Muscles do infold the whole Arm, two in the fore parts, and three behind. You shall separate the two Benders of the Cubit, on the former and inner part.

Biceps.

The first which presents it self is the *Biceps* or *Two-headed Muscle*, which from its Original to its Insertion, may very easily be divided into two. But you must mark, that one Head of the *Biceps*, which growes out of the Coracoides, has a certain flesh adjoynd to it, which creep along the side of the Pectoral Muscle, as far as to the middle of the Arme, unto which it is fastend most firmly; and this Portion of Flesh makes a Muscle, which is ordained to draw the Arm forwards, which from its original I call *Coraco-ideum*, the *Coraco-idean Muscle*.

Coracoides.

I have observed the *Biceps* or *Two-Head* in a very strong and brawnie Man to be a *Triceps* or *Tri-Head*, being exquisitely separated into three parts, both in the Original and end thereof. The third Head sprang out of the tendon of the pectoral Muscle.

Brachii internus.

Under the *Biceps* is placed the *Brachii internus* or *Inner Arme-Muscle*, whose original is at the end of the Muscle *Deltoides*. This Muscle must be separated sidelong from such as border upon it.

In the outer part of the Arme three Muscles are placed, viz. the Longus, Brevis and Brachieus externus, and beneath the Elbow, the Angoneus is seated.

The external are the ^a Longus and ^b Brevis which embrace that Mass of flesh which makes the Brachieus externus. In their original they are distinguished by the tendon of Musculus latissimus which comes between them: but at their Insertion they grow together by a firme and sinewy tendon. And therefore they are easily, in their upper-part, separated from the Brachieus externus; but in their lower parts towards the Elbow, they are very hardly divided from the Brachieus.

Longus Brevis.

Brachieus-externus.

Now thus you shall proceed: you shall curiously take away the nervous tendon neare the Elbow, and going upwards by little and little, you shall gently cut on the one side and the other, also inwardly; diligently observing the line which separates the long Muscle from the short, until you have separated the Brachieus externus, from the Muscles which are placed above it. Then you shall see it arise from the Bone of the Arme, a little beneath the Neck thereof, with a fleshy substance.

^a T. 22. f. 1. G. ^b T. 22. f. 1. H. ^c T. 22. f. 1. I. f. 2. B. ^d T. 22. f. 1. A. ^e T. 22. f. 3. E. ^f T. 22. f. 3. F. ^g T. 22. f. 3. above E.

The Muscle Angoneus^a cannot be seen til you have pulled away the sinewy membrane wherewith it is covered. It arises at the lower part of the Arme neare the Elbow, lying hid between the Radius and the cubitus, and it is inserted into the Cubit. It is of the Length and thickness of a Mans fore-finger.

Muscles of the Radius, the Wrists, the Fingers, and the Thumb.

In the Cubit you shall find the Muscles of the Radius, the wrists, the Fingers, and the Thumbe. And in the Inside of the Cubit as far as to the wrists, you shall find Nine Muscles; on the outside you shall meet with seven.

In the Inside you shall find them disposed in this Situation and order following. The first that presents it selfe is the Longus^b Supinator Radij, which arises from the external apophysis of the Arme, and is stretched out upon the Radius.

Longus-Supinator radij
wrist-benders.

Next to that, is the Radiens^c Flexor Carpi, after which follows the ^d Palmaris

Remarkable by a very small and very long Tendon. By the Palmaris is seated the ^e sublimis Digitorum Flexor, and next to it, so as to touch the same, you have the ^f Cubiteus Flexor Carpi.

On the upper part of the Cubit, near the Joint, between the Longus Supinator and the Radiens flexor, the round Head of the Pronator^g Radij shewes it selfe; which is a very short Muscle, arising from the internal Apophysis of the Arm and Radius, obliquely carried to its insertion into the Radius.

Pronator Radij.

Vnder the Radiens, lies the Flexor^h Pollicis.

Beneath the Sublimis, lies the Profundusⁱ Flexor Digitorum, and in the lower part of the Cubit, by the wrists, lies the ^k Quadratus spread under the Tendons of the Muscles, being three Fingers broad, and immediately fastened Cross-waies, into the Radius and Cubitus.

Finger-benders

^a T. 22. f. 3. a. f. 4. G. ^b T. 22. f. 4. E. ^c T. 22. f. 1. M. ^d T. 22. f. 1. K. ^e T. 22. f. 1. O. f. 5. A. ^f T. 22. f. 1. M. ^g T. 22. f. 2. C. ^h T. 22. f. 2. D. ⁱ T. 22. f. 1. P. f. 5. B. ^k T. 22. f. 2. D.

On the outside of the Cubitus above the Radius, the Extensor^a Carpi is stretched out.

Extenders of the wrist.

Next to it, is the Alter^b Extensor, which is carried obliquely to the Cubit, and being fastened thereunto, takes its course downwards.

Between the Radius and the Middle-part of the Cubitus, the Extensor^c Digitorum is placed, which has a parcel of flesh annexed unto it, spread under the Muscle of the Extensor Pollicis.

of the fingers.

Vnder it, near the Cubit, lies the Extensor parvi Digiti, by the Wrist.

Under the Tendons of the Extensor Digitorum you shall find two other small Muscles, the one of which is the Extensor^d Pollicis, the other is the ^e Indicator ordained to wait upon the Index or Forefinger, whose Tendon is united by certaine Fibres with the Tendon of the Extensor Digitorum.

The

The best way
to dissect these
muscles.

Muscles of the
Hand.

Obliquus de-
scendens.

The division of all these Muscles is *easy* on the upper part of the Cubit, both on the inside, and on the outside, and in the said upper part, you must begin your section. For if you should begin at the *Tendons* you would multiply *Muscles*, and make as many Muscles as you find Tendons. Thus therefore, neare the Wrist, on the inner side of the Cubit, you shall distinguish the *Tendons* of the *sublimis* and the *Profundus*, allotting four Tendons to each Muscle, and then take your course upwards.

Radius Externus extensor Carpi, is termed also *Bicornis* two-horned, by reason of its double Tendon. You may divide this Muscle into two, Muscles, distinct in their original and insertion, but you shall do better to make but one of it.

In the Hand, you shall find *Seventeen* Muscles.

In the Palm or Inside of the Hand there are Thirteen; viz. the four *Lumbricales*, the *Hipponenar*, the *Thenar*, the *Anti-thenar*, the *Abductor Indicis*, the *Massa Carneae*, and the four *Interossei interni*.

^a T. 22. f. 3. H. ^b T. 22. f. 3. G. ^c T. 22. f. 3. R. ^d T. 22. f. 3. M. ^e T. 22. f. 3. L. ^f T. 22. f. 3. C C C C. f. 2. ffff. ^g T. 22. f. 1. S. j. 2. b. ^h T. 22. f. 4. K. ⁱ T. 22. f. 1. R. f. 2. G. ^a T. 22. f. 2. ffff.

In the outside of the Hand you shall find only the four *Interossei externi*; with the Tendons of the Finger-stretchers, or of the Thumb-stretcher, and of the little Finger-stretcher.

Muscles of the Abdomen or Belly.

In your anatomical Administration of the Muscles of the Belly you shall thus proceed. The first you meet with, which must be plucked out, is the *Musculus Obliquus descendens*, which you shall see conjoynd with the *Serratus major*, ^d tooth within tooth, as if the Edges of two Sawes were Put together, and Joyned one within another, or as some parts of the Scul are coupled by the sutures. You shall know the difference of the *Serratus* and *Obliquus* one from another, by certain white lines and by the different posture of the Fibres. You shall separate the *Musculus Obliquus* from its intanglements with the Teeth of the *Serratus major*, with help of a very small and sharp Pen-knife.

The first tooth is interposed between the *Musculus rectus* and a portion of the *Serratus*: the second and the ^e third are very hardly separated. The other four lie lurking under a portion of the *Latissimus*, not receiving the fleshy Productions of the *Serratus*.

To bring them therefore into sight, it will be convenient to pluck up a portion of the *Latissimus*, as far as to the hinder spine of the *Os Illium*; and then you shall take thoe four Teeth off from the Ribs, and in conclusion you shall cut off the Muscle, from the whol Rib which appertains to the *Os Illium*.

If you be industrious and can endure to take pains, you shall observe that the second, third, and fourth Tooth [or Finger] of this Muscle, doe creep higher up under the *Serratus*, than vulgar Anatomists imagine, and that this Muscle does there attain a sinewy tendinous Head, which cleaves fast to the lower side of the Rib.

A tendinous Head receives a portion of the intercostal nerve.

^b f. 2. I I I I. ^c T. 1. f. 2. H H. T. 2. f. 8. A. ^d T. 2. f. 8. a a. ^e T. 1. f. 2. F F. T. 10. f. 1. C. D.

For the nerve, when it is come thither, it is divided into two parts, the one of which does insinuate it self into the sinewy Head of the Tooth of the Muscle: the other sticking fast unto the Rib, does make the ^a nervous interfections of the *Musculus Rectus*. The Muscle being thus cut up, must be turned back upon one side of the Belly.

You shall in the meane while observe, that the ^b *Aponeurosis* of this Muscle, is bored through near the *Os pubis*; as the ^c *Aponeurosis* of the *Obliquus ascendens*, and of the *Transversus* are perforated; near the foremost and lowest Spine of the *Os Illium*; and therefore the Holes of the two oblique Muscles are not set just one against another, but at a distance one after another; that the Gut might not be so apt to fall down into the Groine or Cod.

These

These Holes are broken in Ruptures into the Cod, or else dilated, which are diligently to be observed, in reducing of the Gut when it is strangled in the Groine.

And if at any time an Incision be made in the Groine, to reduce the Gut, that hole ought to be made wider by Incision, that the Gut may more easily returne into the Bellie.

Above the Obliquus ascendens towards the Hypogastrium, you shall find a little Nerve which insinuates and winds it selfe into the Apophysis of the Peritonæum that it may be carried to the Testicle, because it penetrates the transverse Muscle. It arises from the Nerves of the Loines, and is a portion of those nerves which are disseminated into the Oblique Ascendent and the Transverse Muscles.

When you have cut the *Oblique Ascendent* from the Rib of Os Ilium to which it cleaves very fast, you shall bring it to the Loines, where it may be separated from the Transverse. Then you shall separate it from the Ribs themselves as it returns upwards. And it will be convenient to turne back this Muscle to the contrary side, after the manner of the primus Obliquus; and when you shall come unto the Musculus Rectus, you shall observe that this same Oblique Muscle does embrace the Musculus Rectus or streight Muscle above the Navel, and below the Navel it transmits a single Tendon under the Rectus, which notwithstanding by the Edge of the Rectus does cleave so obstinately to the Aponeurosis of the Oblique Descendent, that it is not possible by any Art to separate or pul them asunder, without rending them.

^a T. 2. f. 9. d d d. ^b T. 2. f. 8. b b. ^c T. 2. f. 8. B. ^d T. 2. f. 9. A. ^e T. 2. f. 8. d d. f. 9. b b. ^f T. 2. f. 8 B. c c.

While you cut the Tendons of the oblique Muscles from the share Bones, be very careful least you mangle the Apophysis of the ^a Peritonæum which is carryed through those Tendons, and teare the ^b Muscle Cremaster placed upon the said Apophysis, and also least you teare the Tendon of the Transverse Muscle lieing beneath.

You shall know the *Muscle Cremaster* by its colour and Consistence. For it is a peice of red flesh, thin, sprinckled with streight fibres, severed some space from the flesh of the Oblique Descendent, and according to the Length of the Groine, incloseing the Apophysis of the Peritonæum. You shall find such a parcel of flesh in women, but shorter and narrower, placed upon the production of the Peritonæum.

How the cremaster is known.

Between the Oblique ascendens and the transverse Muscle towards the Loins, many veins are seen, which are the offspring of the Lumbal and the Hypogastrick Veins. But you shall take precise notice of two remarkable nerves or sinnewes, which besides the little intercostal twigs inserted into the Teeth of the Oblique Descendent Muscle, do arise out of the two inner Vertebra's of the Back, and creeping obliquely upon the bastard Ribs, are by the last Rib dispersed into the flesh of this Oblique and the Transverse Muscles.

You may conveniently separate the ^c *Musculus Rectus* following the white Line, but not medling with the ends thereof. If you shall diligently and leasurely pare off the extremities thereof opposite unto the Linea Candida or white Line, you will find the intercostal Nerves which bore their way through the peritonæum, that they might come unto and constitute the nervous ^a intersections of the Muscle, which now and then are wanting, as I have observed in some Bodies. I have often found two imperfect ones above the Navel; if a third be found, it is alwaies directly opposite unto the Navel; you shall very rarely find a fourth Intersection.

Musculus rectus.

^a T. 2. f. 9. E E. ^b T. 6. f. 2. D D. ^c T. 2. f. 8. e e. f. 9. C. ^d T. 2. f. 9. d d.

Towards the end of Rectus Musculus, on the inside you shall observe the Epigastrica ^b ascendens and the Mammaria ^c descendens to ^d meet together about the middle of the Muscle, where they grow into one by a close Anastomosis.

which is the true Linea candida.

That which separates the right Muscles is a real ^e white Line stretched out from the

the xiphoides as far as to the Conjunction of the Share-Bone; and it is simply done of them, who call the growing together of the nervous conjunctions or Aponeuroses of the Obliquus descendens, the *White-Line*, seeing the Aponeuroses themselves are united continually and not disjoyned by any apparent Line.

In big-belly'd women when their Bellies are very much distended, in the last months of their going with Child, by reason of the Drawing of the Musculi Recti atunder, a certaine black-blewish Line remains for two or three months after the woman is delivered, which begins at the *xiphoides* and reaches unto the place where the share-bones grow together, which vanishes away by little and little, the Right Muscles being reunited and growing together againe.

Pyramidalis.

Over the lower end of the Right Muscles lies a smal Muscle called *Pyramidalis* which you must curiously part into two, and having taken away one, you shal see a most strong sinewy Tendon of the Musculus Rectus, fastend to the Os pubis or Share-bone.

Transversus.

The Left *Pyramidal Muscle* is oft times shorter and narrower than the right.

The *transverse Muscle* which cleaves to the Peritonæum, is not easily drawne off yet if you are desirous to take it away, you must cut it from the Loines, and then gently separate it from the Peritonæum with your fingers alone.

^b T. 2. f. 8. e. ^c T. 2. f. 8. d. ^d T. f. 8. f. ^e T. 1. f. 2. KK. ^f T. 2. f. 9. DD. ^g T. 2. f. 9. Af. a a &c. ^h

Muscles of the Yard.

The Yard-Erector.

In a Mans Yard on either side in the Groine and the peritonæum you shal search for two Muscles, haveing first removed a great deal of fat wherewith they are covered.

The one of these Muscles is *Erector Penis* the *Raiser* of the Yard, which arises from the Sphincter Ani or Arse-muscle so called, and is inserted into the hollow and spungy Ligament of the Yard.

The Accelerator.

The other being placed upon the Urethra or Piss-pipe is called *Accelerator* or the *Speeder*, it arises out of the same Tuberosity beneath the spungy ^c ligament of the Yard, although it be fastened by a bit of flesh to the foresaid sphincter or Arse-Muscle, that it may beare up the fundament. which fleshy portion or bit of flesh forementioned I am wont to shew for the Levatores externi ani, or external Arse-Heavers.

Muscles of the Fundament.

The Sphincters of Anus. The Levatores ani.

The Fundament has sixe external Muscles belonging unto it. The *Sphincters*, and foure external *Lifters*, for the *Levatores interni* or *inner-lifters* do lie out of sight. In women there is a fift Muscle which belongs to the Coccyx or Crupper-Bone.

In the first place you shal anatomise and shew the *Sphincter d Cutaneus*, then another larger red Muscle, and then the side-muscles before and behind, the *Levatores* which arise out of the tuberosity of the Huckle-bone, you shal seek for them behind the Crupper-bone and above the acceleratores on the foreside, putting your hand in beneath, or putting in a little knife made of boxe-wood. But you shal more evidently discern the largeness of the *Levator Ani*, if you shal rake away the Bladder, the *Intestinum Pectum* or Arse-Gut and the womb of a woman, and withal shal sever the Conjunction of the share-Bones.

For then you shal see a broad but thin peice of flesh, drawn out from the Os Sacrum as far as to the Spine of the Os Ichiij, underproped with a firme ligament, which is in that space, and produced as far as to the Os Ichiij it self: which fleshy Membrane ought to be taken for the *Levator*: for under it the *Obiurator Internus* is situate.

The Muscle peculiar to the Coccyx in women.

Besides those Levatores there is another found to arise from the farthest extremity of the Os sacrum and the Crupperbone, viz. a thin and sharp pointed peice of flesh shewed with right fibres, encloeing the lateral parts of the Crupper-bone or Coccyx

Coccyx on either side, which holds up the Sphincter, and so the external Orifice of the Privy Parts in Women are widened, this Muscle drawing the Crupper-bone backwards, that in Child-birth the passage may be more free for the Infant.

I have seldom seen *such a Muscle* in the Bodies of men, and the use of it when it is extant in men, is, to render the voidance of Dung more easie, by drawing back the Crupper-bone when men are at stool.

^a T. 6. f. 1. *aa*. f. 5. *HH*. ^b T. 6. f. 1. *bb*. f. 5. *II*. ^c T. 6. f. 5. *KK*. ^d T. 3. f. 4. *O*. ^e T. 6. f. 3. *NN*.

The *internal Sphincter* (if we must needs admit, and allow of a third) is no other than a *Membranous parcel of flesh, somewhat black and blue*, which comprehends the *Rectum Intestinum*, or Arse-Gut, like a Sheath or Scabberd, being adorned with streight Fibres, and interwoven with a few circular ones; which if the Coat of the Guts is fleshy, it differs from that common Coat of the Guts, which covers their in-side. So the *Rectum Intestinum* is distinguished from the rest, neither is the Scituation of the Membranes, or Coats, varied.

The internal Sphincter.

The Bladder-Muscle.

The *Bladder-Muscle* ^b *Sphincter*, is placed in a Man above the *Prostatae*, which it imbraces for the Space of two fingers breadth, and is easily found without the Channel of the Piss-pipe: If you shal cut up the Pipe with a pair of Scissers from the Nut of the Yard, as far as to the *Prostatae*.

The Bladder-muscle in men.

You shal examine if you can find two *Sphincters of the Bladder*, one beneath, and the other above the *Prostatae*, which I never observed.

^a T. 2. f. 5. *Q*. ^b T. 6. f. 5. *FF*.

Now that part of the Neck of the Bladder, which respects the Bones of the Share, is manifestly fleshy, between the two Kernels called *Prostatae*: and there a two-fold Sphincter may be allowed; one fleshy, placed upon the *Prostatae*, and in that sence above them; but under the *Prostatae*, is the Membranous Muscle of the Neck of the Bladder: the other broad Muscle above the *Prostatae*, and turned back under the same, will be the Second Sphincter Muscle, because it does circularly imbrace the *Prostatae*, above and beneath.

Demonstration of the Double Sphincter.

The Neck of the Bladder in women, is very neer as long as ones Thumb, being Nervous, Spongy, and black within, like the Piss-pipe, or Urethra in Men, and compassed about with reddish flesh, which is taken to be the sphincter: and while the Neck of the Bladder in women swells, if you put your finger within the water-gate, you shall percive an hard and long tumor or swelling. and the uppermore carnositie of the Privie Part, which closes and stops the end of the Bladder, is both in Girles and women allwaies found larger than the rest, and the other glandules being by frequent child-bearing torne and defaced, this allwaies remaines to the End of their lives.

The Bladder-Muscle in women.

Muscles of the Clytoris.

You shall seek the *Muscles of the Clytoris*, after this manner; having leasurely taken away much fat till such times as ruddi flesh appeares, you shall sever the *Latissimus Musculus* which lies very low, growing out of the sphincter of the Fundament, and inserted into the very Lips of the Water-Gate or female Privity, for the moveing or straitening whereof, I conceive this Muscle is ordaind. The other is the *Gracilis Musculus* fastened to the Ligement of the Clytoris.

Latius.

Gracilis.

Musculus of the Thigh.

In the Cavity of the Belly, when the Entralls are removed, you shall observe above the Loyns the *Musculus longus and rotundus*, the long and round Muscle which is termed ^a *Psoas*, which you shal sepeate from its original to its insertion which is in the small Trochanter

Psoas.

^a T. 10. f. 1. *O. O.* T. 23. f. 1. *A.*

I have oftentimes in Men, and sometimes in Virago's, or manly Women, observed another *lank Muscle* placed over the Pfoas aforesaid. It seems for this Cause added, that as a Ligament or Band it might strengthen, and as it were gird in the loose and loose flesh of the Muscle Pfoas.

Iliacus.

The Cavity of *os Ilium* is filled by the *Musculus latus* ^a *Iliacus* or broad *iliak muscle*, which together with the Pfoas being conveyed along upon the *Os Pubis* and by its tendon united to the Pfoas, is terminated in the small Trochanter.

Having turned the Body, you shal proceed to the *Muscles which make the Buttocks*, called *Gloutii* that is Buttock Muscles. There are three of them resting one upon another.

Gloutius major

The first and greatest ^b *Buttock Muscle*, you shal sepearate towards its tendon, both before and behind, having first made it cleane and freed it from the fat.

Then you shal proceed in your section upwards til the whole is on all sides cut of, til you come to its insertion, which is in the great Trochanter, and there you shall leave it, or having first taken away the broad band, you shal cut off the said Muscle in the fore part.

Medius.

Under this lies the *Gloutius* ^c *Medius* or middlemost *Buttock muscle*, which may easily be separated in its upper and lateral part towards the *Os sacrum*. But beneath the middle part of the *Gloutius Secundus* the ^d *third* is placed, immediately fastened to the *Os Ilium*: this Muscle you must not cut of.

Minimus.

Between the middle and the lesser Buttock Muscles there are two remarkable veins, which from the *Hypogastrica* doe creep over the *Obturator Internus* ^e with an Arterie, Hand in Hand, and a portion of the *Nervus major posticus*, they spread themselves into numerous branches: and there arise most cruel pains in the inmost parts of the Buttocks, which counterfeit the *sciatica* or Hip-gout. Would not drawing blood from the Hemorrhoid Veins, serve well to disburthen these parts?

^a T. 23. f. 1. B. ^b T. 23. f. 2. B. f. 3. A. ^c T. 23. f. 3. B. f. 4. C. ^d T. 23. f. 4. B.

Quadrigemini

In the next place you shal proceed to the *Quadrigemini* and the *Obturatores*, which are seen beneath, the greater Buttock Muscle being taken away. The uppermost being the first and longest of all, is called the ^a *Pyriformis* unto which the two ^b *Parvi* or little ones doe follow in order, coupled together, that between them and in their Bosome as it were, they might contain the Tendon of the *Obturator internus*.

To these two there is orderly adjoynd the ^c *Quadratus Quadrigeminus* being broader and more fleshy than the rest.

Obturator internus.

The *Obturatores* are two, the ^d *internall* and the ^e *external*, the Internal has its original out of the Circumference of the Oval hole; and its Tendon being carried along between two Ligaments, and being hid in the bosome or holownesse of the second and third Quadrigeminal Muscles, it is carried into the Cavity of the great Trochanter. And therefore you must pul asunder the second and third Quadrigeminals, before this Muscle can come in sight.

Now the Ligaments through which the Tendon of the *Obturator Internus* is carried, are two; the one being *external* is carried from the *Os sacrum* to the Tuberosity of the *Os Ischij*: the other being *internal* and placed beneath the external, is carried from the same *Os sacrum*, into the spina of the *Os Ischij*.

Externus.

The *Obturator externus* cannot be discovered unless the fourth broad Quadrigeminal Muscle be plucked back, and that the Propagation thereof may more evidently appeare, you shal take away the *Musculus Triceps* or Three-Headed Muscle.

Sometimes I have observed above the *Primus Quadrigeminus*, the *Iliacus externus Gracilis*, which from the lower and transverse spines of the *Os sacrum*, did end into the top of the great Trochanter. You shal therefore anatomise and shew eleven Muscles of the Thigh, placed above the *Os Ilium*.

In the hinder part are nine, *Three Gloutij* or *Buttock Muscles*, which being drawn aside, there appeare four *Quadrigemini* and two *Obturatores*. In the fore part

part and hollownels of the Os Ilium are found *two Muscles*, the Psoas which indeed has its original higher than from the Os Ilium, and the *Iliacus*.

^a T. 23. f. 3. C. f. 4. D. ^b T. 23. f. 3. f. 4. G. ^c T. 23. f. 3. D. f. 4. E. ^d T. 23. f. 3. E. f. 4. F. ^e T. 23. f. 4. e.

Muscles of the Leg.

In the Thigh from the Haunch to the knee and Ham you shal observe and shew eleven Muscles.

In the fore part you shal find seven, the *Longus*, the *Fascia lata*, the *Rectus gracilis*, the *Duo Vasti*, the *Crureus* and the *Triceps*; which are to situate, that in the first place you meet with the *longus* or *sutorius*, then the *Membranosus* or *Fascia lata*. According to the streightness and length of the thigh the *Rectus Gracilis* is drawne out. Neare and bordering upon this are the *Vasti duo*, under which lies the *Crureus* which immediately covers the Os femoris, or Thigh-Bone, Adjoyning to the vastus internus is the *Triceps*, which lies sculkeing within the Thigh.

Sutorius.
Membranosus.
Rectus.
Vasti.
Crureus.

In the hinder-part of the thighs you shal find *four*, disposed after this manner. Unto the *Triceps* on the Inside is fastened the *Gracilis Posticus*: bordering upon it, is the *seminervosus*, with the *Semimembranosus*, and between this and the vastus externus is the *Musculus Biceps* placed.

In the forepart of the thigh, you must begin at the ^a Long Muscle; which being cut of, you shal cleverly take away the *Fascia* ^b *lata*, either all of it or as much as you can, and you shal bring it as far as to the knee.

Then you shal cut of the *Gracilis* ^c *Rectus*.

Afterwards you shal proced unto the *two vasti*, which that you may more easily separate from the *Crureus*, they are distinguished one from another by a line running between them, which you shal cut up.

Then you shal dissect the *Vastus* ^d *Externus* by the *latus externum*; but it is harder to sepearate the *Vastus* ^e *internus*.

^a T. 23. f. 1. II. ^b f. 1. E. c c c. ^c f. 1. F F. ^d f. 1. G G. ^e f. 1. H H.

And you shal begin to separate the same at the lower part neare the Patella, and thrusting in your hand, and neatly mannageing your penknife, you shal cut it towards the upper parts: and so the two *Vasti* shal be severed from the ^a *Crureus*.

From these, you shal come unto the ^b *Triceps*, which may more truly be termed *quadriceps* or rather *quadrigeninus*, because of foure Heads and as many distinct Insertions.

Triceps.

It is placed in the inner part of the Thigh, and its first and upmost portion growing out of Os Pubis, seems to be a *Distinct Muscle*, which in regard of its situation may be termed *Pectineus*.

Pectineus.

I have sometimes found *four other portions perfectly distinct one from another*, besides the *Pectineus*, and the last portion was verie long, like a semi-nervous Muscle, and was carried on with a sinewy tendon as far as to the Leg.

I conceive this is the Muscle, which has been in women observed distinct from the rest, in the hinder part of the thigh, and is wont to be joyned as a fist, unto the four *Postici*. For it arose from the Tuberosity of the Ilium and was inserted into the Hinder Part of the Tibia.

It is found in Women, because they were to have broader Buttocks and larger Thighs than Men.

It is an easie matter to separate those *four Muscles* placed in the hinder part of the thigh, viz the ^c *Seminervosus*, the ^d *Semimembranosus*, the ^e *Biceps*, & the *Gracilis internus*. I have often found the *Biceps* distinct both in its Original and Insertion.

Seminervosus.
Semimembranosus.
Biceps.
Gracilis.

^a T. 23. f. 1. &c. ^b T. 23. f. 1. &c. C C. ^c T. 23. f. 3. G G. ^d T. 23. f. 3. H H. ^e T. 23. f. 3. III. ^f T. 23. f. 3. F F.

Muscles

Muscles of the Tarsus.

Gemelli.
Popliteus.
Plantaris.
Soleus.
Foot-benders

Extenders.

The separation of these
Muscles.

In the Leg from the knee unto the Tarsus are found 13. Muscles; in the hinder part you shall find five placed after this manner.

The first are the ^a Gemelli; under their Heads lies the ^b Popliteus hidden; between the Gemelli and the Soleus, the ^c Plantaris hides it selfe.

The Soleus lying beneath the Gemelli, does immediately cover the shin-bone.

In the lateral and external Part of the Tibia, by the Spine, there appeares the Peroneus ^c Flexor pedis, Neighbour to which is the Longus ^f Extensor Digitorum.

After which follows the Extensor Pedis, tibieus ^s posticus. Under the Extensor longus Digitorum, lies the Extensor ^h pollicis; and beneath the Flexor pedis Peroneus, lies the Extensor ⁱ Peroneus.

The Flexor ^k pollicis does take up the internal and lateral part of the Tibia. In the lower part of the Tibia, between the flexor pollicis and the Tibieus posticus, the Flexor ⁱ digitorum medius holds its place.

It is easie to separate the Muscles which infold the Tibia on all sides, provided you do first pluck off the fascia ^m lata, which is carried out as far as to the foot. Having divided the Heads of the Gemelli, you shall diligently search for the Popliteus or Ham-Muscle, situate obliquely over the Head of the Soleus. Then you shall observe the fleshy Head of the Musculus Plantaris, which lies lurking between the Gemelli and the Soleus. The Plantaris is like the Palmaris.

In the fore part of the Tibia the Peroneus externus and Peroneus internus seem to make one Muscle, because they arise from one and the same part, and are carried through the Cleft of the external Ankle-bone.

But the one is internally inserted into the Os meta-tarsi, which sustaines the little Toe: The other being drawn under the sole of the feet, is carried into the Os metatarsie which sustaines the Great Toe.

^a T. 23. f. 1. d d. f. 3. K K. ^b f. 4. H. ^c f. 3. M. ^d f. 3. L L. ^e f. 1. L L. ^f f. 1. M M. ^g f. 2. E E. ^h f. 1. N. ⁱ f. 2. F F. ^k f. 4. K. f. 6. B. ^l f. 4. I f. 5. C. ^m f. 1. E. c c c.

In the Foote you shall take notice of seventeene Muscles. In the out side of the Foote there are five, viz. the ^a Pedieus and the foure interossei ^d externi.

In the sole of the Foote you shall observe twelve, viz. the Brevis Digiti ^c Flexor or little-Toe bender, the three ^d Lumbricales, those which are made out of the Massa ^e Carnea, the foure external Interosseans and as many ^f internal.

Upon each side of the Foote is placed one Muscl, viz. the Abductor & Pollicis; and Minimi Digiti abductor.

In the hollow of the foote, there is placed another Massa carnea, spread under the first, and cleaving immediately to the Bones. it may be perfectly divided into foure or five portions, although in the middle spaces of the Bones of Metatarsus the Musculi Interossei are contained.

Furthermore in the Sole of the Foote you shall find that same Internal Muscle which is opposed to the Abductor Pollicis or Great-Toe withdrawer, like unto the Antethenar in the Hand. It may be called ⁱ Musculus Transversalis.

Chap. 46. Of the Veines, Arteries and Nerves belonging to the Limbes.

the Veines of
the upper
Limbes.
Axillaris.

The Veines of the Limbes begin in the Arme at the Arm-pit, and in the Feet they take their Original from the Groines.

The Vena ^k Axillaris neare the Arme-pits does produce the Humeralis, which is called the ^l Cephalica or Head-Veine. It has no Arterie to accompanie the same, and it holds its Course through the whole Radius.

A little

A little after it sendes forth the ^m *Thoracica* which is expanded into external parts *Thoracica*. of the Chest, and meets with smal twigs of the *Venæ azygos*.

It is afterward termed ^o *Basilica* and by the Bending of the Arme, it is divided *Basilica*. into two branches. The ^p one of which creeps all along the inside of the Cubitus; the other being ^a external descends beneath the Skin unto the Hand.

^a T. 23. f. 2. G. ^b f. 2. a a a a. ^c f. 4. L. f. 6. A. ^d f. 6. e e e. ^e f. 6. D D. ^f f. 5. d d d d. ^g 1. f. 3. O. f. 5. b b. ^h f. 3. P. f. 5. c. ⁱ f. 5. b b. e ^k T. 24. f. 1. A. ^l f. 1. B B B. ^m f. 1. l. m m. ⁿ T. 12. f. 1. a a a a. ^o T. 24. f. 1. C C. ^p f. 1. e e. &c. ^a T. 24. f. 1. x. y. &c.

The *Ramus internus* or inner branch is called *Mediana* ^b *Vena*, and it receives *Mediana*. a branch of the ^c *Cephalica* below the bending of the Arme, where it is called the *Cephalica* or *Basilica*. These three Veines are opened beneath the Bending of the Arme.

But the *Basilica* has an ^d Artery under it or very neare it, and a ^e Nerve and the Tendon of *Musculus* ^f *Biceps*, which bends the Arme: which parts must (in the opening of a veine) be avoided, for if they happen to be cut, they bring great Inconveniencies to the Arme.

The *Cephalica* being stretched out upon the ^g *Radius* neare the wrist, diverts to that part of the hand termed *Metacarpium*, that it might with its twigs water the Hollow of the Hand.

Between the Ring-finger and the little finger, they place the ^h *Salvatella* veine, *Salvatella*. which is wont to be opened; between the thumb and the fore finger, there is another opened, which is called *Vena pollicis* or the thumbe veine.

The *Mediana* ^k vena is to tally external and runs under the Skin, into the palme of the Hand.

The *Basilica* creeps through the ^l internal and external parts of the Cubit, with a two-headed branch.

Now the Veines have one thing peculiar to them in the Limbes viz. that they manifestly do communicate with the Arteries. This *Galen* proves in his third *Anastomosis of the Veines and Arteries*. *Book of Natural faculties, the last Chapter*, And up and down in other parts of his works. Which thing is so manifest that it ought not to be called into question.

Moreover the veines in the ^m Limbes and internal Jugulars have *Valves*. In the *The Valves of the Veins* greater channells and in the division of the lesser ones there are ⁿ two on each side one opposed to the other and placed interchangeably.

^b 1. t t. &c. ^c f. 1. f f. ^d f. 2. A. by L. ^e f. 3. 1. 1. &c. ^f T. 22. f. 1. G. ^g T. 24. f. 1. i i. &c. ^h f. 1. z ⁱ f. b ^k f. 1. e ^l f. 1. o o. x. y. &c. ^m f. 7. the whole ⁿ f. 8. the whole.

Now we may doubt of their use since the circulation of the blood has been found out, for the common opinion was that they were placed in the Limbes and in the internal jugular to stop the exceeding flux of blood into those outmost parts which are in continual motion. But those that hold the Circulation of the Blood, do say their use is to hinder the flowing back of the Blood which ascends upwards unto the Heart, according to the opinion of Dr. *Harvy*, unto which I willingly give my Assent. *Their use.*

Let us pass on from the Veines to the Arteries of the Arme. The *Ramus super-clavius* proceeding to the Arme-pits, is termed ^a *Axillaris*. It accompanieth the *Vena Basilica*, whereas there is no Arteria *Cephalica*. *The Arteries. Axillaris.*

Neare the Arme-pits it produces the ^b *Thoracica* and in its progress bestowes certaine twiggs upon the bordering Parts, and being lengthened out as far as to the bending of the Arme, it is divided into two ^c branches, which are carried on, to the Inside of the Hands. *Thoracica.*

For the outside of the Hand above the *Metacarpium*, is void both of Muscles and Arteries.

Rami minores. The other ^d Branch being drawn out upon the Inside of the Radius, is felt to beat in the wrist.

The other running streight along the Ulna is with its Cofin spread out into the hand according to the length of the Thumbe and of the little Finger, so as to bestow of their twigs upon every Finger.

The Nerves. I shall in the same Method dispatch the Nerves of the whole Hand.

Out of the Holes of the foure lower Ver-tebra's of the ^f Neck, and the two first Ver-tebras, of the ^g Back; ^h five or sixe Nerves take their Original, which being over-whelmed under the Muscle scalenus, they are brought under the Clavicula, as far as to the Arm-hole, where they are ⁱ twisted one within another, like the strings of a Cardinals Hat.

^a T. 24. f. 2. A. ^b f. 2. c. d. ^c f. 2 C. B. ^d f. 2. B. ^e f. 2. C. ^f f. 3. 4. 5. 6. 7. ^g f. 3. 1. ^h f. 3. a. b. c. d. e. ⁱ f. 3 XX.

Afterwards the foure superior ones are under the Deltoides scattered over the internal part, accompanying the Vena basilica and the Artery of the Arm, and creeping betweene the Muscles Biceps and the Brachieus externus.

The ^a first and sixth ^b Nerve, being bowed back under the scapulary Muscle *Rotundus major*, they are disseminated into the hinder Muscles of the Head.

There remaine then the Quatuor Primi already described, which being carryed through the Arme and Cubit; they are dispersed into the said Cubit and the Hand

Primus.

The *Primus* ^c Nervus beneath the head of the shoulder is over-whelmed in the *Coracoidæus* and drawne along under the inner side of the Biceps, and lurking under the Tendon of the said Muscle, it joines it self to the Vena Cephalica, where it growes small: also it is placed beneath that Veine, below the bending of the Arme.

Secundus.

The *Second* ^d Nerve being undivided and thicker, does descend to the bending of the Arme, being covered only with fat, and at the bending of the Arme it is placed beneath the Arteria and Vena Basilica.

Howbeit the Vena Basilica a little below the Cubit does, towards the interior part, recede a little from that Nerve, that it may be united to the Vena Cephalica.

But foure fingers beneath the bending of the Arme, being alwaies superintendent to the Basilica, it passes undivided along, unto the wrist, the veine appeares above.

At the Wrist tis cleft into ten small branches affording two little twigs to every finger, which crepe along the sides of the said fingers.

You shall observe by the way, that three fingers breadth beneath the bending of the Cubit, it is covered by the Muscles which bend the wrist and Cubit, which arise out of the internal Tuberositie of the Arme.

Tertius.

The *third* ^e Nerve is carryed along undivided unto the Angona, where being conveyed through a Cleft which is betweene the Elbow and the inner Condylum or Tuberositie of the Arme, according to the length of the Cubit, and being drawne out over the Cubitæus externus, it is carryed unto the wrist, towards the little finger. And therefore by leaneing on the elbow, the whole Arme is benumbed. Being divided neare the Hand into foure branches, it is spread into the out-side, of the Hand or Back of the Hand.

^a T. 24. f. 3. ff. ^b T. 24. f. 3. II. ^c T. 24. f. 3. gg. ^d T. 24. f. 3. KK. ^e T. 24. f. 3. hh.

Quartus.

The *fourth* Nerve is the thickest of all interwoven with Veines and Arteries, and sunk deep in the *Brachieus externus*; it is carryed from the forepart of the Arme into the Hinder part, and descending there through unto the Radius, and being carried all along the same, it is joined to the vena Cephalica, and looses it selfe at last into the wrist.

The veines of the lower Limbes. Poplitea.

I proceed unto the vessels of the Inferiour Limbes. The Crural ^b veine, does in the groine produce a remarkable branch viz. The ^c saphena, which according to the longitude of the *tutorius Musculus* descends unto the Ham. Beneath which, in the Anckle it constitutes the *vena poplitea*, which was opened in Times past. There it transmits the branch which is in the upper part recurrent, above the Ham, unto the crural veines, or the saphena receives that same branch, from those cruralls.

Afterward

Afterward being divided into two parts it slips down unto the two external Ankles, but the greater portion takes its course unto the internal Ankle, where it formes the true *Saphena* which is usually opened.

It is termed corruptly *Saphena*, as if one would say *Saphaia* because of the Appearance, which is a new name brought into use by the late Greekes, unknown to *Galen*.

Saphena.

When the crural veine has produced the *Saphena*, it is soon after divided into four branches, of which, the two ^f external and lateral ones which are the shortest are disseminated into the superior Muscles of the Thigh, both the internal, namely the Biceps, and the external viz. the vasti and the Musculus Cruræus.

^aT. 24. f. 3. ii. ^bT. 24. f. 4. A. ^cT. 24. f. 4. a a a. ^dT. 24. f. 4. fff. ^eT. 24. f. 4. a. beneath ^fT. 24. f. 4. b b. &c. ^g

The Ramus tertius which penetrates into the inner parts, is termed *Iſchiadi-* *cus*.

Iſchiadicus.

The fourth is called ^b *Muscularis*.

Muscularis.

These branches being propagated, the Trunke of the Vena cruralis being split into two, descends unto the knee, being attended with the crural Artery branched into two: But one of the ^c branches is aloft and waters the external parts, the other is more ^d deep: both of them do afford twigs to the neighbouring parts, and when they have reached unto the Ham, being spread along between the *Soleus* and the *Gemelli*, they descend to the two Ankles.

The lesser branches.

But the external Ankle is principally watered from the low-laid crural veine, yet so that in the compass of the Ankle two notable veines are observed.

That which quarters upon the Malleolus internus or inner Ankle-bone, is the branch of the *Saphena*. That which takes its course beneath the malleolus, being spread out above the Tarsus, is a branch of the crural Veine.

Neither of these Veines can be safely opened, unless they swell, by reason of the neighbouring arteries, which the Vena *Saphena* placed in the inner Ankle is free from. And this Veine is opened in all diseases as well of Men as of Women. Yet nevertheless in the *Sciatica*, the Veine beneath the Malleolus externus, is more advantageously opened, because it has greater Communion with the Part affected, namely the Coxendix or Hip.

The Distribution of ^c *Arteria Cruralis*, is not equal to the Vena Cruralis, because it produces no *Saphena*. For a little lower than the Groine, it transmits two ^f within the Musculus triceps, which are lengthened out as far as to the Gloutij.

The Arteries.

Cruralis.

Afterwards it sends forth ^g two, into the former parts of the Thigh.

^aT. 24. f. 4. c c. &c. ^bT. 24. f. 4 d d. ^cT. 24. f. 4. b b. ^dT. 24. f. 4. g g. ^eT. 24. f. 5. A A. ^fT. 24. f. 5. &c. ^gT. 24. f. 5. d d. &c.

And then the *Cruralis* descends undivided as far as to the Ham, Where it is divided into two Branches; the ^a one of which does laterally creepe all along the outside of the Leg upon the Musculus *Peroneus*. The other being thrust into the Muscle soleus, and sliding down unto the Heele, is disseminated into the sole of the Foot; and the other is branched forth into the outside of the Foot.

Its branches.

The Vena *Saphena* has no Artery to attend it, and there is not any nerve near it, and therefore it may safely be opened.

The Nerves of the foreside of the Thigh are two, distinguished in their original, but so as they soon grow together and become one cord, which is carried entire without any division, unto the Groin. Where it is distributed into five ^c branches, commonly wrapped up in a Membrane, which being dispersed on every hand into the Muscles of the fore part of the Thigh, they are branched out as far as to the whirlbone of the Knee.

The Nerves of the fore part. The first.

Now the Rite of these Nerves is in the ^d three lowest Vertebra's of the Loyns, neither is it visible, unless the Muscle *Psoa* be torn asunder, within which they lie hid.

The second.

Then besides those fore-mentioned, you shal see another *smal Nerve*, drawn through the oval hole of the *Os Pubis* and spent upon the neighbouring Muscles viz. the *Triceps*.

Of the Hind-part.

The first.

A great and very thick Nerve does glide along the hinder part of the Thigh, which in its Original is made up sometimes of three, oftener of four portions, which are bred out of three or four of the upper holes of *Os sacrum*, and being carried along through the cavity of *Os Ischii*, which is seated between the spines of the said *Os Ilium* through the internal and hindermost Muscles of the Thigh, undivided, sometimes doubled and solitary without the society of a vein and Artery, as is ordinary in other Nerves of the Body, it is carried into the Ham; where being divided into two, sometimes into 3 four, it bestows little smal twigs (considering its bulk) upon the Neighbouring Parts.

^a T. 24. f. 5. ii ^b T. 24. f. 5. II. ^c T. 24. f. 6. B C D. &c. ^d T. 24. f. 6. 3. 4. 5. ^e T. 24. f. 6. E E. ^f T. 24. f. 6. 6. ^g T. 24. f. 6. i. k l. &c.

Its Branches.

The other ^a Branch descends through the Calf of the Leg to the Heel, dealing out little Nerve in its passage, and being drawn through the Cleft of the inner Ankle-bone, it is distributed into the sole of the Foot in as many Branches as there are Fingers.

Another is carried into the ^b fore part of the Foot, fastened unto the *Perone*, and so slipping downe along unto the external ankle, and when it is come thither, it is spread abroad into the upper side of the Foot, as was said of the former.

A Bastard Sciatica what?

This exceeding great and thick Nerve being ill disposed or diseased, a Bastard *Sciatica* is thereby caused, which consists wholly therein; there is a grievous paine, which afflicts not only the Hip, but reaches into the Thigh, the ankle and Foot, namely to all places whether the Nerve which comes from the diseased Hip does reach. *Fernelius in the 18. Chap. of the 6. Book of his Pathology.* and therefore in this bastard sciatica Causticks are to be applied, and Issues made at the bending of the Buttocks, also those parts must be anoynted and smeared with an Epispastick or drawing Plaster.

You shal observe by the way in a bastard sciatica, that those nerves are watered by the Hypogastrick veines and the Arteries above the same, and therefore the nerves cannot be dried unless the Hypogastrick veines are emptied, by many times letting blood in the Armes and Feet; and by Horse-leeches often applied to the Veines of the Fundament.

Now Galen in the 8 Chap. of his 16. Book of the use of the parts of our Body, shewes the reason why this same Nerve is not mixed with other fore nerves as it is in the Nerves of the Arme, but is carried behind the thigh; viz. Because the joynt of the Arme stands farther from the Vertebra's of the Neck, than the joynt of the Thigh does from the Vertebra's of the Loines and *Os sacrum*.

The second.

About the Beginning of this great Nerve, there is another adjoined, which rising out of the third hole of the *Os sacrum*, and being carried along above the spine of *Os sacrum*, it is branched out into the *Musculi Gloutij* and the *Flexores Tibiæ*, as far as to the Ham.

The Medicinal Consideration.

Varices

what they bee?

Their Cure.

Whether a veine cut off will grow againe?

Diseases of the Veines belonging to the Limbes, especially to the Leg and Thigh, are the *Varices* which are knottie dilatations, in which the Blood is collected, as it were into Certaine Satchels. Now they are cured with astringents with a close and convenient ligature. Or the veines are pricked and the blood let out, or at the beginning of the varix the largest vein which gives nourishment to the rest, or the beginning it selfe, is tied up and cut off. Many conceive that the veines cut off are bred againe; they bring for an example the veines which are seen in a very great *Sarcoma* or fleshy Excrecence; but *Fernelius* has rightly observed, that they are not veines, but channels between the Skin which nature has framed as gutters to water and nourish the *Sarcoma* or fleshy Excrecence,

Many

Many thinke that the veines which are cut, being tied together with a string do grow againe, which I do not beleive.

Hippocrates calls the veines *Spiracula Corporis*, the vents of the body or the breathing holes thereof, which being opened, the Body is aired: and he saies that when the Veines are dried, they draw sharp and cholerick humors in burning fevers. Also the same Author saies, that the veines do draw more than the flesh Lib. 1. de Morbis. Especially if they be more hot and dry than ordinary.

When the Veines being debilitated through Sicknes of the Liver, become nauseant and enclined as it were to vomit, they suffer the Blood to run out, not only through the mouthes of the upper and lower veines, but also through the Skin of the whole Body, in manner of a bloody sweat, which I have observed two or three times.

Bloody sweats
whence they
proceed?

A stoppage of the Veines and Arteries, does often happen in Plethorick bodies, so that in all places in which the pulse is wont to be felt, the motion of the Arteries is abolished; in which case *Hippocrates* commends blood-letting, as a meanes to put the vessells into motion againe.

The motion of
the vessels how
abolished?

Sometimes the Pulse of all the Arteries is intercepted, not excepting the Groine or crurall Arteries, the Motion of the Heart still remaining, which disposition if it continue long it kills the Patient. But if the motion of the Heart be perished likewise, the Patient dies suddenly. I have seen two that had no pulse at all, only their Heart continued beating, who lived sixteen yeares, but in extreme weakness. *Balduinus Ronsaus* saw one in the same condition, as he affirms in his medicinal Epistles.

Hereupon, a question may be raised, how the pulsation of the Arteries can be stopped whiles the Heart beates after its wonted manner, though slowly; whether it be not necessary in such a Case that the Aorta be obstructed neare the Heart, and that the irradiation and influx of the arterial blood be by that meanes intercepted. And then the Blood of the veines approaches the Heart, being drawne thither in the diastole or dilatation thereof, that it may receive the seale of Vitality in the right ventricle; and being afterwards driven forth by the Systole or Contraction into the vena cava, the vital spirits are forcibly carried into the length of the channel, and by the mutual anastomoses of the veines and Arteries, they are communicated to the said Arteries with the blood. I have in some persons observed that the motion of their Arteries hath been frequently intercepted or became very unequal for some daies together, afterwards the impediment being removed which was near the Heart, I found the same inequality in the *Celiac Arterie*, which did beat vehemently, although the pulse appeared equal and wel ordered in the rest of the body. This, I conceive happened by reason of a little bit of flesh or fat, which ascending to the Gates of the Heart did cause such a pulse so inordinate, and being repelled or drawen back unto the *Celiac Arterie* which is a branch of the Aorta, it did produce such an irregularity as aforesaid.

How the motion of the pulse in the Arteries can be stopped, while the Heart moves.

The *Crural Arterie*, seeing that it is evident in the Groine, and subject to our feeling, the pulse thereof is easily discerned, being vehement in regard of the greatness of the Arterie, and the last which remaines after the pulse is extinguished in other extreme parts of the Body, wherein it is usually felt to beate. And therefore when no pulse can be felt in the other usual places, it must be sought for, examined in this crural Artery, not only in Men but in women also, provided the Rules of Honesty be not broken. And if when a disease is at the Height, we can feel no pulse in this part, death is neare at hand.

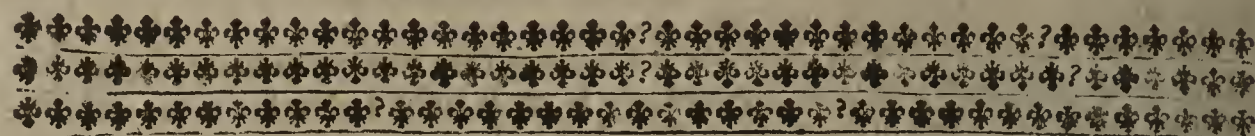
The Pulse is last felt in the crural Arterie.

The *Dilation or Section of an Arterie* happens chiefly in the external parts, where the lesser Arteries reside which are branches of the great Trunk. And this disease is termed *Aneurisma*. It is seldome seen in the trunk of the Aorta because of its thickness.

Aneurisma, what it is?

The End of the Fifth Book.

K k 2



THE
SIXTH BOOK
OF THE
ANATOMY
AND
PATHOLOGY
OF
John Riolanus,
THE
KING'S PROFESSOR
OF
PHYSICK.

A new *Osteologia* or History
of the Bones.

Wherein he treates of the Bones, Ligaments and Gristles of the whole Body, by which the frame of the Body is compacted together, the Muscles being removed, handling al the Diseases and symptomes which happen unto the Bones.

C H A P. I.

***** He Scope of Nature and of the Physitian about the Body of Man its
***** Fabrick, are contrary, the one unto the others Nature intending
***** to make up the Body of Man, begins at the most simple parts, and so
***** proceeds by little and little to the more compounded ones, until she
***** finish her work. But the Physitian, that he may attaine unto the
***** knowledg of this workmanship of Nature, proceeds gradually from
the more compound unto the most simple parts; so that in his Analysis or Resolu-
tion, these parts are last which were first in the Composition. So when we pul
down

The Method.

down an house, first we throw off the Ceeling, then we demolish the walles, and lastly we dig up the foundation. Wee in like manner in our takeing asunder this Houle of Mans body by Anatomical Administration, do now in the last place treat of the Bones which are the foundation of the whole Body, and placed before all other parts. we shal consider of them in the way of a new kind of *Osteologia* or History of the Bones, which is no less, & necessary than the doctrine of the Skeleton of the Bones.

Why we treat of the Bones in the last place?

Having therefore explained and demonstrated the softerparts of the Body by way of Analysis, I proceed to the last and more solid parts thereof, which according to the Syncherick method, or order of composition, are the first, such as are the Bones, which are now otherwise considered than when they are boiled and dried and so demonstrated.

Chap. 2. *Of the great Profit of this new Osteologie, or Doctrine of the Bones.*

There is a two-fold Doctrine of the Bones; one is demonstrated in dried Bones, which have been prepared by boyling; the other is shewed in the Bones of the Body, while they remain naturally fastened one unto another. Both these Doctrines are useful in the Art of Healing, and for such as would have a perfect knowledge in the Body of Man.

The Doctrine of Bones demonstrated in a dead body, is better, & more necessary.

For in the dried Bones, in which commonly this Doctrine is taught, nothing is learned, saving the external shape, posture, and composition or frame of one with another: But a diligent observation of the Bones, while they are knit and fastened one unto another, is more conducing to practice. Because the fastenings of the Bones one unto another by Gristles and Ligaments, also by the severall sorts of Articulation, or joynting, are in some dried Bones quite different from what they are in such as be moist; for in dried Bodies you would think that some Cavities are hollow, and Cup-fashioned, the Cavities being empty, and bereaved of their Cartilages; which notwithstanding appear shallow in a fresh Body, the Cavities being full of Gristles; and contrary-wise, you would in a Skeleton say, that some Cavities are shallow, which are deep in a flesh Body, the hollownes being encreased by a Gristle brim.

For the perfect knowledge of Mans Body.

Moreover, The external Conformation and Quality of the Bones, is more evidently discerned in the Bones of a Carcase, which loses much in Bones that are prepared by boyling: as for example, the Gristly incrustations of the extremities, the Membrane which is about the Bones, and the Mucous, or slimy substance lodged between the Bones; also the internal substance, or Marrow, or Marrowish Juyce, are manifestly discovered in the Bones of a fresh Body, which are not at all in dry and withered Bones.

And

And therefore in respect to the Practice of Physick, and the Cure of vitiated bones, and such as are broken, or out of Joynt, it is necessary, diligently to look into, and carefully to examine in a dead body, the Natural Conformation of the Bones, and their conjunction one with another. I do not dislike the use of dried Bones, to reach and demonstrate the vulgar Osteology, or Doctrine of bones, at which we must begin, as we have done in this Treatise; provided the Demonstration of the bones in a dead Body be afterward added to the former.

For the Practice of Physick

Than the Vulgar.

For by this Reperition, and Representation of the bones, we shal imitate the Order and Design of Nature, which in the Generation of the Parts of our Body, is wont in the first place to form the bones; but she finishes, and perfects them after all other parts, for they grow as long as the body encreases, according to Aristotle. And if we beleave Hippocrates in the Sixt Book of his Epidemicks; Women have their Couries, til their bones have attained their utmost perfection.

where notwithstanding we ought to begin.

Chap. 3. *What is to be observed in the Bones of a dead Body not boyled.*

The Natural
Constitution
of a Bone in
what it consists?

In what the
preternatural.

IN the first place, you shal observe the Natural Constitution of the Bone, that you may discern the fault of a bone which is out of Order.

A bone in a living Body naturally disposed, ought to be, 1. Hard, to procure the bodies stability. 2. It ought to be Oily without, because it is nourished. 3. It must be covered with the Periosteal Membrane, that it may have fence; for if it lose the Periosteum, it becomes fenceless. 4. It must be white tinged with a moderate redness, because it is a Spermatick part, and is nourished with the dewy vapor of the blood. 5. It must be hollow, or spongy, that it may continue the substance of Marrow, or a Marrowy Liquor to nourish it self withal. 6. It must be at the ends crufted with Gristles. 7. It must be anointed as it were with an oily moisture, to facilitate its motion. 8. It must have a continued and even substance. And therefore you shal know that a Bone is misaffected, if it be soft, as *Ruellius*, *Fernelius* and *Hollerius* have observed, that in some persons the Bones of their Bodies were by sickness become so soft and flexible, that you might bend them which way you pleased, like wax. *Aristotle* in the third book of his History of Animals, saies that bones are not flexible, neither are they apt to split, but only subject to break. *Scaliger* in his commentary adds: I have seen the thigh-bone by reason of the venereous disease, or by use of I know not what medicaments, bowed like an horne. Geographers write that in a Country of Ethiopia, the inhabitants have naturally from their birth bodies so flexible, that they can turne and wind them into any posture. I have read in *Hippocrates* of a boy that was borne without bones, having the Principal parts of his body otherwise distinct. *Forestus* saw a boy made after the same manner in some of his members.

Wherefore if a bone shal be drie without, it declares a distemperature of the part: if it be white it argues want of heat, if red, inflammation; if black, rottenness and blasting. If a bone be sensible, there is some secret fault in its substance, or in its periosteal membrane. If it be solid and concrete without cavities or parts, it renders the body heavie and sluggish, and can containe no marrow. *Plinie* relates that there are some that lived having solid bones and without marrow, which are very rare and are termed *Cornei*. The signe of such a Constitution is never to thirst and never to sweat. They are called *Cornei* from the Cornel or Dog-tree; because the male Cornel has no pith or marrow. See *Rhodiginus*. Such a one the *Syracusan Lygdamus* is reported to have been, who in the three and thirtieth Olympiade was the first who at the *Olympick Games*, became Victor at all Exercises and won the *Paneratian Crowne*: his bones were found to have no marrow in them, as *Solinus* relates in his 4 Chapter. *Antigonus* in his Book of wonders Chap. 8 Writes that the bones of a Lion are so solid that you may strike fire out of them as out of a flint; Howbeit *Columbus* denies that such bones are void of marrow. Which *Epicurus*, contradicting *Aristotle* maintaines, as possible in the 8. Booke of *Athenus* his *Deipnosophists*. *Aldrovandus* has observed that an ong Fowles the *Estrich* has solid bones, void of marrow. But in case a bone should be deprived of its Gristly Crust and of its periosteal Membrane, it is moved with difficulty, and has no feeling at all. If a bone become uneven and prominent so as to have bunches upon it, it is termed *Exostosis*, which is an effect and concomitant of the venereous pocks when it is of long standing and confirmed, howbeit it may spring from some other cause. Finally being depraved and mishapen, or disjoined, it hinders and mars the Action of the whole body or its parts; and being divided in its substance, it argues solution of Continuity by some cleft or fracture. and although a broken bone by the mediation of a *Callus* becomes scoddered together one the outside: Yet does it still remaine divided within.

Chap. 4. Of the Nourishment, Sence, and Marrow of the Bones.

While the Bone did live and was nourished, it had a twofold sustenance, the one remote, the other conjunct or immediate according to *Aristotle*, in his Book of the parts of live-wights. The remote Sustenance of the Bones, is the thicker and more earthly part of the blood. The next or immediate is the marrow, or marrowy liquor, which is contained in the hollownes and porositie of the bones. *Hippocrates* in his Book de *Alimento*, saies that the marrow is the Nutriment of the bones, and therefore it is that they are Joined together or soddered up by a callus. How can it be (may some man say) that the blood should nourish the bones, seeing they have no veines, which are the channels to conveigh blood to all parts? *Hippocrates* saies in his book de *Ossium Natura*, that of all the bones, the lower Jaw-bone alone has veines. *Galen* indeed in his 8. Booke de *Placitis*, attributes unto every bone a Veine greater or Lesser according to the Proportion of the Bones: and in his *Comment upon the first Booke of Humors*, he saies that there is a Vessel distributing blood allowed to every bone. But he confesses in the last chapter of his 16. Booke de *Usu Partium*, that the veines of the Bones are so small and fine, that they are not so much as visible in the larger sort of Animals or Live-wights, because nature according to the Necessity and Indigence of the Parts, bestowes upon some greater, upon other lesser Veines, moreover the little holes which are found about the extremities of the bones, do manifestly declare that somewhat there is which goes into the said Bones now their is nothing goes into the bones but little Veines. If we beleive *Platerus*, the Arteries doe no where enter into the bones, seeing the spirits can easily penetrate into any of the bones without the service of the Arteries to carry them. Neither do I conceive that there are little nerves diffused through the substance of the Bones to give them the sence of feeling, because all the feeling they are capable of, is by means of the periosteal Membrane which does incompass them. Nevertheles *Nicolas Massa* call's God to witnes that he saw a Man, who had an ulcer in his thigh, so that the bone was bare, in which bone there was a sence of paine, so that he could not endure to have it touched with a rough instrument in regard of the paines it caused, and it was freed from the periosteal Membrane. Yea and he bored the bone, and found that it had the sence of feeling within the same, which he therefore thought good to declare, that Anatomists might be moved to consider, whether some branches of nerves do not Penetrate into the substance of the bones.

The remote matter that nourishes the Bones.

The immediate matter.

whether the Bones have Veines?

whether they have Arteries?

Or Nerves?

Threefold Marrow of the Bones.

We cannot looke into the Cavities and Marrowes of the Bones; unles they be first broken. I observe a threefold Cavity of the bones and a threefold marrow.

In the greater Cavities of the larger Bones, the Marrow is reddish; in the lesser Cavities of the smaller bones the marrow is white; In the spungy bones there is contained a marrowy Liquor.

In the meane while you shall observe, that the marrow within the Cavity of the Bones is compassed with no membrane, neither is it made sensible by any little nerves penetrating the substance of the bone, as *Paræus* does imagine. *Hippocrates* himselfe, in his Booke de *Principiis* was the first that noted this. The Marrow of the Back-bone is not like that marrow which is in other Bones, for it alone has membranes, which no other marrow has besides it.

whether the Marrow of the Bones be compassed with a Membrane.

Chap. 5. Of Articulations or Jointings of the Bones.

LET us proceed to the Joinings-together of the Bones.

There does concur to the Articulations of the Bones, the Head, the Cavity, the Gristle, the Flegmatic moisture, and the Ligament.

Every Head is in its owne nature and original an Epiphysis, but in process of time it degenerates into an apophysis.

To the Articulation of the Bones there concurs.

an Head. The

The Head is within of a Light spungie and porous substance, being filled with blood or with a marrowy Juyce, on the outside it is covered with a very hard shell or bark, very thin and compact, which is crufted over with a smooth and polished Gristle.

Now the Head of a Bone is ^a great and long, or short and flat, which is termed ^b *Candylos*.

^{A cavity.} The Cavity of the Bone which receives the Head, is also crufted over with a Gristle, which if it be deep, it is called in Greek ^a *Cotyle*, if shallow, 'tis called ^b *Giene*.

^{A Gristle.} It is sometimes encreased with a Gristle brim, lest the bones should too easily slip aside, and fall out of their places.

^{A flegmatick Humor.} And in the Cavities themselves, there is contained a clammy, thick, and Oily *Pituitous Humor*, to procure a more easie, and expeditious motion of the Bones, so we grease the Axle-trees of Coaches and Carts, that the wheels may turn more easily and quickly.

Through want of the foresaid Humor in such as have the consumption, and are extreemly dried, while they go and stir their Limbs, one may hear as it were their bones knock one against another, and rattle in their Skins: As is proved by a memorable History, recorded by *Symphorianus Campegius*, in the *Medicinal Histories of Galen*; and as I my self have often times seen.

^{A Ligament.} Now that the bones might be so knit together, as to make a Joynt, there is need of a Ligament or Band, whose substance is broad and round, its color white or bloody, such as is the round Ligament which fastens the ^c Leg, and the ^d Thigh, and that which unites the ^e *Astragalus* with the ^f *Pterna*, and that of the *Astragalus* with the three Bones of the *Tarsus*, which are termed ^s *Æneiformia*. For these bloody, or bloodyish Ligaments, are alwaies interposed between the bones, and are very hard; but those which are drawn about the Articulations, do alwaies appear white. So the Nerve-Gristly Ligaments, which are interposed between the *Os Sacrum*, and *Os Ilium*, are observed to be bloody in a Woman newly delivered of her Child:

^{why the bones are articulated.} Now every Conjunction of the Bones is made by Nature, either for *Motions sake*, or for *Perspiration*, or for the *Passage of some certain Substance*, or for the *differencing of Parts*, or for *Security*, and to *preserve from violence*.

^a T. 21. f 1. d. d. f 4. a. ^b T. 21. f 1. & 2. 11.

^a T. 21. f 4. B. ^b T. 21. f 4 F. ^c T. 21. f 7. a. a. ^d T. 21. f 8. a ^e T. 21. f 5. A. ^f T. 21. f 5. B. ^s T. 21. f 5. E E E.

Conjunctions of the bones for *Motions sake*, are seen in the *Fingers*, *Wrists*, *Elbows*, *Shoulders*, *Hips*, *Shanks*, *Ankles*, *Ribs*, *Spondyls*; in a word, in al movable Articulations.

For *Perspirations sake*, we see bones joynted together in the *Sutures of the Skul*.

For to give passage to some substance or other; we see the like conjunction at the production of the *Pericranium*, and at the through-fare of some certain Vessels, which go partly out, and partly in; to which intent the *Sutures of the Skull* were contrived.

For *Securities sake*, and to avoid the violence of breaking, &c. we see the said Conjunction, in al such bones as are compounded of divers smaller ones.

For the differencing of parts, certain conjunctions of bones seem to have been contrived in the Bones of the upper Jaw.

Having laid this Foundation out of *Galen* 11. Book, de *Usu Partium*, chap. 18. it is an easie matter to prove the sorts and differences of Articulations, out of the Doctrine of *Galen* himself.

^{Two-fold conjunction of bones.} The Bones are joynted one with another, some by Articulation, or joynting; others by *Symphysis*, or cleaving together.

^{what a joynt is.} A Joynt termed *Articulus*, is a Connexion of Bones, ordained either for motion, or for some other Cause.

^{Sorts of joynts.} In respect of motion, there are two sorts of Joynts. The one is contrived for manifest and strong motion, which is called *Diarthrosis*: The other is ordained for an

an obscure and difficult motion, or for none at all, and it is called *Synarthrosis*.

Of the former kind of conjunction of bones, viz. *Diarthrosis*, there are three sorts; *Enarthrosis*, *Arthrodia*, and *Gynglymos*. Particulars of each sort.

Of the second kind of Articulation, viz. *Synarthrosis*, there are in like manner three sorts, *Enarthrosis*, *Arthrodia*, and *Gynglymos*; because *Synarthrosis*, and *diarthrosis*, do differ only in the quantity of the motion; as *Galen* does teach in his Book *de Ossibus*, which also he manifestly declares in his Book *de Dissect. Muscul.* Chap. 22. neare the end. and in the 13. Book *de Ossibus*.

But because a *Synarthrosis* is ordained not only for motion, but for some other cause, as namely for perspiration, the transmission of some substance, the differencing of Parts, and to save from harm by stress and violence; it comprehends three other sorts under it, viz. *Sutura*, *Harmonia*, and *Gomphosis*.

These six differences of *Synarthrosis* or joynting may be proved by sense and by Example. The ^a Ribs are joynted to the ^b Brest-bone by an *Arthrodia*, which in regard of motion may be referred to a *synarthrosis*. The ^c Bones of the wrist are coarticulate with the bones of the ^d Metacarpum (*Galen de usu partium* Lib. 2. Chap. 8.) but that *synarthrosis* is made by the way of *Arthrodia*. The ^e Astragalus is joynted to the ^f Scaphoides with an obscure motion, which is *Enarthrosis*. *Lib. de Ossibus*, Chap. 24. *Gynglymos* is found in the Vertebrae of the ^g Back, which is to be counted as a kind of *Synarthrosis*; the *Gynglymos* of the other Vertebrae, is a kind of *Diarthrosis*. *Galen* in his 26. Book *de Campos. Med. secundum locos*, and in his 12. Book *de usu Partium*, calls the sutures ^h of the Head *synarthroses*. Also he calls the harmonia of the ⁱ inferior Jaw-bone, *synarthrosis*, in his Comment upon the Ninth part of the second book *de Fracturis*. The bones of the Sternum or Brest-blade ^k being immovable, are joined together by a *synarthrosis*. From *Galen* in his book *de Ossibus* and other places of his Writings, I could prove, that the Jaw-bone and the bones of the Brest-blade are Joined together by symphysis, because they grow together as the Perlon comes to yeares, so that no markes are remaining of their former distinction. So *Galen* in his Book *de Ossibus*, calls the Conjunction of the inferior Jaw-bone with the Chin, *Symphysis*. Examples of the sorts.

Symphysis is an immovable union of the Bones, which is performed either with somewhat intermediate or without. Symphysis, what it is?

In regard of the threefold Medium, some *Symphysis* is called *Synchondrodis*, from the Cartilage Gristle which is the Medium of the Union, a second is termed *syneurodis*, from the nerve which is the medium, a third is called *Syssarcodis*, from the fleshy Medium. To which we may ad a fourth termed *Neurochondrodis*, because the Union is made by a Medium which is of a mixt nature, being partly nervy, and partly gristly. But more may be seen of this, in *Galen* his Doctrine of Bones. Its Differences.

^a T. 10. f. 2. 1. 2. 3. &c. ^b f. 2. A A. ^c T. 21. f. 1. & 2. F. ^d f. 1. H H. f. 2. G. ^e f. 5. A. ^f f. 5. C. ^g T. 10. f. 3. ^h T. 15. f. 1. a a. &c. ⁱ T. 8. f. 4. D. ^k T. 10. f. 2. A A.

The differences of *symphysis*, do appeare in the bones of the ^a lower Jaw, in the Bodies of the ^b Vertebrae, in the bones of the ^c share one with another, and in the conjunctions of the ^d Iliac bones with the ^e Os sacrum, in the growing together of the vertebrae of *Os sacrum* one to another, and of the epiphysis; and in the conjunction of the *Os Sphenoides* with the Occiputs bones, and in the conjunction of other bones, which in children were divided, but in persons come to yeares, they are found growing together by *Symphysis*, *sine Medio*; such as are described by *Galen* in his Book *de Ossibus*. Its differences exemplified

The Ligaments which knit the bones together and that flegmatick humor wherewith the bones are incased, and the Gristles, both such as are common to divers bones articulated together, and likewise such as are proper to the particular bones to crust the ends of each of them: all these shall be treated of in our particular Muster and Surveigh of the Bones.

The Medicinal Consideration.

The General Diseases of the Bones are, *Caries* or Rottenness, and putrefaction,

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General diseases of the Bones. which *Caries*

which proceeds from a common, or extraordinary Cause, such as is the Venereal Pox.

Exostosis. *Exostosis*, or a swelled knot upon a bone, which arises from the foresaid Causes.

Kedmata. *Kedmata*, mentioned by *Hippocrates*, which are Chronical Diseases, proceeding from defluxions, common to all Joynts, but especially infesting the Hip-bone. Of these kind of Diseases, read the *Medicinal Definitions of Gorraeus*, and *Foesius* in his *Oeconomia Hippocratis*.

Hydarthrosis. Of kin to this, is *Paracelsus* his *Synovia*, or *Hydarthrosis*, which is a continual Flux of wheyish or blood-watry Humor, out of exulcerated Joynts, especially if the Nerves or Ligaments be Diseased. *Hildanus* in a peculiar Book on this Subject, proves that this Disease *Synovia* (which was first so called by *Paracelsus*) is the same with that Disease which is termed *Meliceria*, by *Cornelius Celsus*, Lib. 3. Cap. 26.

A sure thing it is, that the bones being diseased; do drop blood, and *Galen* observed as much.

Fracture. The bones are likewise subject to *Fracture*, or breaking, and Luxation, Dislocation, or disjoynting. Now a *Fracture* of a bone, is a Division made in a bone by some external Cause, cutting, or bruising the same.

Its kinds. There are two sorts of *Fractures*, a straight one, and an oblique, or crooked one. The former is according to the length of the bone, or overthwart.

The latter, or oblique is (if we believe *Galen*) too curiously differenced by the latter Physicians which have succeeded *Hippocrates*; for it is said to be Nail-fashioned, when the *Fracture* is partly straight, and partly circular; another sort is called *Alphitbedon*, when the bone is broken all to shivers.

Another sort there is, which is called *Apotrausis*, or *Detractio*, whereby a Fragment of the bone is so taken away, that there remains a mark in the surface of the Bone.

Another sort of *Fracture*, *Hippocrates* mentions, which he calls *Apoclasma*, and *Galen* terms *Hapagma*, when a bone is broken there where it is joyned with another bone.

Luxation. Luxation, or Disjoynting, is a Disease of the bone in Situation, when it is removed out of its place.

There is a two-fold Luxation, or disjoynting of a bone; the one compleat, when the Head of the bone is split out of its socket, and this is called *Exarthrema*, a being out of Joynt.

Its sorts, The other is Incompleat, and termed *Pararthrema*, when the bone is in some measure only removed, and lengthened as it were, which is mostly seen in the subluxation of the Thigh. In an *Exarthrema*, the Leg seems shorter than it was wont to be; in a *Pararthrema* it seems longer than usual.

Causes, The Causes of Luxation and Subluxation, that is to say, of perfect, and imperfect disjoynting of any Member, are external, or internal: The External are, a blow, a violent distortion, or wrenching, a fall, and extension of a Member. The Internal causes are, a thin Humor, which does relax the Ligaments, or a thick Humor which by little and little, fills the Cavity of the Joynt, and at last thrusts out the bone, by reason of an *Anchylosis*, which is bred.

Anchylosis. Now *Anchylosis*, is a fault in the Articulation of bones, whereby the Cavity of a bone, which ought to receive the Head of another bone, is filled up; be it what kind of Articulation it may be, either *Enarthrosis*, *Artbrodia*, or *Gynglymos*. Hereupon the bone thus diseased, either is held bowed in, or remains stretched out, and stiff. And in case without the foresaid *Anchylosis*, the Tendons of the one side shall in the Limbs be cut in sunder, the straight or crooked bones do no longer serve to bend or stretch out the said Limbs.

Chap. 6. Of the Bones of the Skull.

HAVING diligently considered the Articulations, or joyntings of the Bones one unto another, let us now take notice what is observable in every particular bone being fresh, which is not to be seen in the Skeleton, or in dried bones. I will proceed from Head to Foot, according as I am wont to do in my Dissection, and Demonstration of these parts. Now my Demonstration of the bones is two-fold; the one I call *Osteotome*, or Bone-Dissection, in which the bones are separated each from other; the other I term *Ossifragium*, in which the bones are broken, that their inner structure may be discerned.

And in the first place, let us contemplate the two-fold Table of the Skull, or the double Skul-board which is thinner in Women, than it is in Men. Things to be observed principally.

The uppermore is thicker, and harder, and more smoothly polished than the neather: but the lower is rough and furrowed as it were, that it might afford place for those Vessels which creep along the *Dura Mater*, from which some notable Vessels arise, which by the Ears do insinuate themselves between those two plates, or boards of the Skull, for to irrigate the intermediate space.

Now that same intermediate space, is a certain spongy Substance, which receives and contains a Marrowy Juyce, serving for the nutriment of those bones. The which Marrowy Juyce is reddish, by reason of blood flowing out of the smal Veins scituate in those parts; which is wont then to flow out when the Skul of a living man is boared through with a Wimble, or other boaring Instrument. Now the Skull, according to *Hippocrates* in his Book *de Vulneribus Capitis*, is double in the middle of the Head, that is to say, hollow between two plates and boards, that it might contain a Marrowy Juyce to nourish the bones. *Hippocrates* adds, The whol Head, a smal part excepted, resembles a sponge full of smal Caruncles, or little bits of flesh, which if you press, and squeeze with your finger, you shal perceive blood to drop out of them: also you shal see smal Veins running up and down, which abound with blood. Two-fold plate.

Out of the foresaid Caruncles, being bruised with a vehement blow, the blood is squeezed, which putrifying, does corrupt the bone, which in the mean while appears found on the out side: but the Sanies sweating out from the inner plate or Skul-board, does corrupt and putrefie the very brain it self. And if so be when the Skul is razed, you see blood come forth, do not therefore conclude that the Fracture penetrates the inner plate; because that blood flows out of the space which is between the two plates, or boards of the Skul. Intermediate space.

That same spungy *Hyperfarcosis*, or breeding of proud flesh, which grows up in wounds of the Head, is bred out of the foresaid Duplicature of the Skul-bone, as *Hippocrates* has observed. Touching the Fungous Excrescences of the brain, whether they are bred from the broken bone, or from the *Dura Mater*, see *Sennertus* in the first Book of his Practice. Why the Skull is double?

But *Hippocrates* his Caruncles, are vainly sought for in this intermediate space, whatever *Fallopins* pleads to the contrary in his Book of the Wounds of the Head, unless a man would call the spungy substance of the bones *Sarcia*, or Caruncles, in regard of their Function.

This intermediate space interposed between the two plates of the Skul, is called by *Hippocrates*, *Diploe*. Howbeit, *Galen* contrary to the Opinion of the Antient Physitians, calls the second, and inmost plate of the Skul, *Diploe*, in the sixth Book of his Method of Healing. Proud flesh in Head-wounds, whence it proceeds?

The Use of this *Diploe*, Duplicature, or spungy substance, is three-fold: First to receive blood for the nourishment of the Skul: Secondly, That the Fleshy Excrescence in the Fractures of the Skul, might grow out of it: Thirdly, That the Fumes of the Brain might more easily be exhaled. The space between the skul-plates, how called.

Sometimes an Humor is collected between the two plates by way of transcolation, which The use thereof.

which being in process of time corrupted, does cause most excessive pains, which often happens in an inveterate Venereal Pox, when the Skul is knobbed, and bunched with a certain *Exostosis*.

This double plate or board, of the Skul has been made by a wonderful contrivance of Nature, lest in all blows upon the Head, the wound should penetrate the whole substance of the bone. Hence it comes to pass, that sometimes one plate is cleft while the other remains unhurt.

The Whore-masters Pox does often-times eat through the external plate, and sometimes through both the plates, without killing the Patient, who lives a long time after; as *Palmarius* avouches in Chap. 4. of his Book *de Lue Venerea*. The like Example you may read in the 18. Chapter of *Benivenius* his Book *de Abditis Morborum Causis*. And I my self have often observed the same.

The Sutures, The Sutures, although they are a very closely united in living Persons, yet are they sometimes very apt to gape, and to move pain, as *Galen* reports, towards the end of his third Commentary in *Officinam Hippocratis*.

^a T 15. f 3. ^a a. b b. f 4 b b. &c.

whether an Issue may be made in the Crown of the Head?

But they seem not at all inclined to any looseness, or gaping about the meeting together of the *Sagittal* and *Coronal Sutures* in Persons come to ripeness of Age, where a *Fontanel* is made; and therefore I have often found by Experience, that this part may without any detriment have a Caustick applied thereunto. Which kind of Practice, *Fabricius* commends in his Chyrurgery; others dislike it as dangerous, viz. *Mathæus de Gradis*, *Vesalius*, Lib. 1. Cap. 6. of his *Anatomy*. *Baptista Montanus* in his 36. Counsel. *Zechius* in his Counsels. And *Baptista Carcanius* in his Book of Head-wounds. See *Claudinus* his Counsels. I confess, that sometimes in Children, this part being soft and gristly, is long ere it grow hard over that it is in grown persons; and *Galen* has seen it in such Younglings to move and pant, *Gal. Lib. 13. Method. Cap. 22*. And in such a case to apply a Caustery, were dangerous. The Africans did burn an Issue in the Crowns of their Childrens Heads; as *Mercurialis* shews from *Herodotus*. They did burn the Veins of the Crown of their Heads, with scalding *Oesypus*, or Sheeps Grease; and in case any Convulsion happened they did Remedy the same by the sprinkling of Goats piss thereon.

whether Black-moors have Sutures in their Skuls?

It is written by *Herodotus*, *Aratus*, and *Arrianus* in the Life of Alexander the great, that the Heads of the *Æthiopians*, and *Egyptians* had no Sutures, which gave *Pareus* occasion to write, That the *Æthiopians* and *Moors*, and those which inhabit hot Regions towards the South, and the *Æquinoctial Line*, have Skuls harder than ordinary, having none, or very few Sutures in them. The falsity whereof did plainly appear, when I dissected a very swartby Black-moor publickly in the Medicinal Schools, whose Skul was in all things like one of ours.

Cavities of the Head.

In the Head there are many remarkable Cavities, which the Anatomists call *Sinus*. These you shall diligently search for, that you may know whether they are void and empty, covered with a thin Membrane, and what communion they have one with another.

Now the Cavities are, on each side four. The *Maxillary Cavity*, which lies concealed within the upper Jaws. The *Frontal Cavity*, seated in the Forehead, by the Eye-brows. The *Sphenoidian Cavity*, which lies hidden under the Seat or Saddle of the *Sphenoides*. The *Mastoidian*, which is contained within the *Mastoides*. They are all empty, and covered over with a thin Membrane, only the *Mastoidian*, is hollow indeed; but has no Membrane, but is distinguished into seven, eight, or nine little Cells, as we see in a Bee-hive.

The Entrance of the *Maxillary Cavity* within the cavity of the Nostrills, is to be seen on the side of *Os Spongiosum*.

The Entrance of the *Frontal Cavity* is seen in the highest and inmost parts of the Nostrills.

The Entrance of the *Sphenoidian Cavity* we find to be deep. Within the nostrills the spongy bones being taken away.

The

The Ingress of the Maxillary Cavity, is evident without cutting the Bones. The Ingress of the Frontal Cavity is evidently perceived, the Frontal bone being cut in sunder above the Eye-brows: The Ingress of the Sphenoidean Cavity, is discerned, as soon as the inner plate of the Sphenoides is taken away. The entrance of the Mastoidean Cavity, is contained in the left side of the *Concha*, neer the Apophysis Mastoides, and cannot be seen unless the arched Vault of the *Concha* be broken, or the porus auditorius pulled in peices.

Sylvius conceives and demonstrates from *Galen* that flegm being transmitted through the little holes of the upper plate, is collected and heaped up within the Sphenoidean cavity, and thence conveyed into the Palate: which way of the passage of Excrements, is by *Vesalius*, *Columbus*, *Falopius*, and *Valverde* rejected: who contradict *Galen* in this point, and maintain that this excrement is voided through the neighbouring holes which rest upon the *Sella Sphenodea*.

whether flegm may be collected within the cavity of the Sphenoides.

The reason of *Gallen* and *Sylvius* is, that it is better the excrements should be strained, and kept up for a season in those Cavities, than that a man should be continually spitting, and holding his mouth evermore open. For although the Sphenoidean Cavities, are in the dissections of dead bodies empty, and appear not to be full either of flegm or serosities: probable notwithstanding it is, that the serous humor which flows and distils out of the Choana, through the sieve-like plate of the *Sella equina*, is transcolated into the Cavities which are beneath, and from them poured back by certaine oval and sufficiently wide Holes, and voided forth into the spongy bones of the Nostrils: neither do they deny, that a part of the serosities, does sweat through the porosities of the inferior table or plate, into the palate. But the serous humor received in the spongy bones of the Nostrils, does by little and little sweat out and pass away, when by its quantity or quality, it provokes nature to an excretion. For to what purpose think you has Nature framed those cavities? Has she done it to make the skull so much the lighter? or that they might be conduit heads or storehouses of aire, which is of necessity breathed in, for the Generation of animal spirits? But they cannot be storehouses, because they are a fingers breadth distant from the frontal Cavities, nor have they any continuation or conjunction with them. Again the Aire which is required to be exceeding pure, would be defiled by passing to and fro through the spongy bones. Furthermore in the many dead bodies which I have dissected, some of which might be snotty and flegmatick, I never found the mammillary Processes any larger than usuall. But by those passages flegm ought to be derived unto the *Os Ethmoides* or Colander Bone; or fluctuating unto the Basis of the Brain, it ought of its own accord to flow unto that place, because the foremost Ventricles of the Braine, are seldom perforated before, so as to have a through-fare into the Nostrils.

The use of the sinus Sphenoides.

Wherefore I conceive that all the snort and flegm of the nostrils is not strained through the Colander Bone, but that it flows down into the Palate through the four pipes or channels of the Choana, or that being collected in the Cavities of *Os Sphenoides*, if it pass through the little holes of the Plate of *Os Sphenoides*, it may be derived into the Spongy bones of the Nostrils.

By what waies the flegm of the nose passes?

The said spongy Bone is full of holes being distinguished, with bony Cells, in which small *Caruncles* or bits of flesh are contained, which being swelled, the disease *Polypus* is bred.

Afterward you shall consider the Passage of the Nostrils into the Palate, by these cavities which are distinguished by the *Os Vomer*. At the roote of the pterygoidean Apophysis, there appears an hole compassed with a Gristle, which is the extremity of that passage, which reaches from the Ear to the Palate, by help whereof Deafe persons heare, if a man speak into their mouth when it is wide open. Also by help hereof the Ear is most easily purged with masticatories.

The passages from the Nostrils to the Palate.

From the Ear to the Palate.

The Medicinal Consideration.

Primary dis-
ases of the
Skul.
Tumors

In the Skul, by reason of the space contained between the two plates thereof, hard tumors are bred, and almost of a bony nature; yea and some are truly bony, such as are *hornes*. An hard, full and oblong tumor is called *Testudo*, of kin to which is the Tumor *Talpa*, which also is called *Topinaria*.

There is another tumor which is termed *Natta*, and growes sometimes chiefly in the Back, which hangs by a small root. This threefold tumor, if timely care prevent not, is wont to grow to a greater Bulke. *Hornes* are wont to grow out in the Skul, the forehead, and else where; yea and upon other bones. I have seen an horne a finger long, which grew out of the lower part of the Leg, like a spur. Of these kind of *Hornes* *Sennertus* has neatly treated, in the fifth Book of his *Practice*.

Fracture

Besides these Tumors the *Fracture* of the scul is frequent, which proceeds from a Violent and external Cause. And it is either without or with Contusion.

There is a threefold fracture without Contusion, the first is termed *diacope*, when an Arrow or dart falls upon the Head and pierces deep, the second is called *Aposcheiparnismos*, which is a kind of planing or shaving as it were, when a piece of the bone is pared away: the third is termed *Hedra* which is a gap or rase made by the cut of a weapon.

Kinds of fra-
ctures.

A fracture with Contusion, if it be strait and in the bone smitten, and immovable, it is termed *Fissura* or *Rima*, by the Greeks *Rogme*: if it be in another bone besides that which was smitten, it is termed *apeichema*, that is to say, a resulting cleft, like the Rebounding of an Echo. If the bone be moved and broken, there is a threefold fracture reckoned; viz. *engeisoma*, which is a depression of the skul to the Membrane or Meninx of the Braine; *Ecpielma* which is a depression of the said Skul divided into thinner and smaller bits: *camaroosis* which is a vaulted Elevation of the broken Skul. *Enthlasis* so called, is indeed a contusion but without fracture, being as it were a flexure or bowing of the soft scul. Which kind of contusion is seen in brazen vessels, as pans and kettles &c. when they are battered only and not broken.

Caries /
Exostosis

In the Bones of the scul we often find a *Caries* and *Exostosis* proceeding from a common Cause, but more often from the *Whores Pox*.

^a T. 15. f. 6. 1.

Chap. 7. *Of the Inferior Jaw-Bone.*

Its substance.

The inferior ^a Jaw-bone is in such as are of yeares one continued bone, without any shew of division, as far as to the Chin.

Articulation.

Its Articulation is very loose, being fastened with an orbicular Ligament.

A movable Gristle is spread over the knob thereof, to procure the freer motion.

Channell.

Within the Jaw-bone there is a crease or Channel cut out, ordained to containe the Vessells, which is separated from the cavity which contains the marrow, that it might afford a small portion of the vessels to every tooth.

This Channell of the Vessells is situate in the middle of the Jaw-bone, and is manifest; and therefore *Hypocaates* writ in his book of the Nature of the Bones, that of all bones only the lower jaw-bone has veines.

^a T. 15. f. 3. L. 2

Chap. 8. *Of the Teeth.*

Afterwards you shal with an Instrument made for that purpose, draw out by the roots one tooth of every sort, that you may contemplate the *Roots* and *Ligaments* of the Teeth, and the forme of their holes or sockets.

When

Chap. 9. Of the Bone Hyoides, and of the Ligaments. 271

When the Teeth are broke, you shall find them stuffed with a slimy substance and with threds, which are the vessels.

The Cavities are more evident in teeth which are withered and dried; it is the best way to compare the fresh teeth and the dried ones together, and to observe the difference.

But that you may discern your selfe and demonstrate unto others the distribution of vessels, viz. of little veines, arteries and nerves into the Teeth: you shall take this course. You shall take an Oxes or a Rams neither jaw (in which these vessels are more apparent) and cut it on the inside, and open it until the marrow and Nerve appeare. The marrow being taken away, And the Membrane of the nerve being torne, the Nerve comes in light, being composed of many little strings, from which certaine fine threds and other things resembling veines and Arteries, being wove together, do enter beneath into the Cavities of the Teeth roots.

The way to shew the vessel appertaining unto the Teeth

To the ^a Dog-teeth and the ^b Cutters a nerve is carried which is more thick than ordinary. To the ^c Grinders according to the quality of their Roots, there is a triple or quadruple very smal and exceeding fine nerve distributed.

Then drawing a Grinder or Cutter leisurely out of its hole, you shall see very smal fibres inserted into the roots of the Teeth, which you shall reckon to be nerves.

The teeth being pulled up cleane by the Roots, in the lowest part of the said roots, there appeares a matter which is partly fibrous, bred of the vessels, and partly clammy, which fastens the tooth into its hole as it were with Glew, by the way of *Syffarcosis*. An Ox or Sheeps-tooth being cut asunder in the midst, the internal substance being clammy, is manifestly interwoven with vessels.

what must be observed in a Tooth that is drawn out?

All these things may be evidently demonstrated in the teeth of an Oxes, Calves, or Sheeps Jaw; they are not so clearly discernable in Man; nevertheless you may perceive the roots of the teeth to be bloody and that a nerve creeps closely into the Roots. But in dried teeth the roots are hollow.

^a T. 15. f. 6. n. n. ^b T. 15. f. 6. m. ^c T. 15. f. 6. o. o.

Chap. 9. Of the Bone Hyoides, and of the Ligaments.

There is a Ligament placed under the Beginning of the Musculus Digastricus or twibellie; which is produced from the Apophysis styloides as far as to the Angle of the nether jaw.

The situation, colligation and structure of the ^a Os Hyoides ought diligently to be observed in a dead Body, because they cannot be seen in a skeleton.

The Situation of the Os Hyoides.

It is placed in the Throat under the lower jaw-bone, hanging upon the Apophysis of the Styloides by the helpe and assistance of Ligaments.

It is made up of five bones, the middlemost of which being the greatest and the broadest, is termed *Basis linguae*, from which on either side there shootes forth a little ^c horn, which is for the most part gristly, seldom bony, being fastened to the upper sides of the Cartilago Thyroides, which two little hornes are accounted for the sixth and seventh bones.

Its structure. Its fastening.

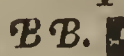
It is worth our consideration which Galen observes in his seventh book of the use of the Parts Chap. 19. How that this same bone is knit and fastened not only by Muscles; but it fastened by Ligaments and membranes unto the Apophyses of the Styloides, and to the upper Hornes of the Thyroides; least one Muscle being palsied, that same counterpoise and equability in the motion of the Muscles should be dissolved, whereby it should come to be drawn on one side more than the other, or slip downwards, which would bring great detriment, and discommodity not only to the voice, but also to the swallow.

why it has many Ligaments?

Nature providing against this Inconvenience, hath tied and fastened it by four Ligaments to the Stoyloidean Apophyses, and to the Cartilage or Gristle which is called Thyroides.

Howbeit, the Hyoidean Bone does in women appear smaller and thinner, and consists of fewer little Bones, whose use is supplied by the suspentory Ligaments, which in them are longer than in Men.

You shall likewise observe that only the Epiglottis is received in the Cavity of Hyoides, the Tongue resting it self upon the upper side of the basis.

^a T 15. f 11, 12, 13. ^b T 13. f 11, & 12. A A. ^c T 13. f 11, & 12. B B. 

Chap. 10. Of the Heads Motion, and Ligaments.

which Vertebra the Head is moved upon.

THE Head is moved by a straight, or oblique motion upon the ^a second Vertebra, which in its hinder part is a fingers breadth distant from the first ^b Vertebra. And the first Vertebra is so closely and firmly fastened to the hind-part of the Head, that it cannot be stirred, or agitated so much as with ones Hand.

Also the Tooth-fashioned ^c Apophysis is so fastly united to the Body of the second Vertebra, that in the bending, and oblique motion of your Head, you may not hurt the Spinal Marrow.

Hence you may be assured of the verity of that Opinion of Vesalius, and other Anatomists, touching the motion of the Head, how it is moved upon the second Vertebra, both in its right, and oblique motions.

For seeing the Head cannot be moved with a circular motion upon the first Vertebra, because such things as are moved with a circular motion, ought to rest upon one single Basis. Yet the Opinion of Galen might be confirmed, by that Natural growing together of the two first Vertebra's of the Neck, which were joyned and fastened together in a certain Soldier, who having in the year 1611. killed a Man in a Tavern, was hanged, and his body brought into the Anatomical Theatre of the University: where while his bones were boyling to make a Skeleton, it was observed that the two first and uppermost Vertebra's of the Neck, did Naturally grow together; yet did he in his life time freely move his head every way, as I have been informed by others. Celsus, before Vesalius and Columbus, described the motions of the Head, in these words:

The upmost Vertebra does altogether sustain the Head, receiving the smal processes thereof through two ^a Cavities: whence it comes to pass that the head is bunched above, beneath, on every side. The second is inserted into the first, for as much as concerns the circuit thereof. The upmost part is terminated with a smaller circle, and therefore the upmost incompassing the second, gives way to the Head to be moved side-longs also.

The Ligaments of the Head.

In the Articulation of the Head, three Ligaments are observed; the one is circular, which compasses the first and second Vertebra within, as far as to the hind-part of the Head.

The other two do appertain unto the Tooth-fashion'd Apophysis: the one fastens the said Apophysis unto the body of the first Vertebra; the other arising from the top of the Apophysis Odontoides, is interted into the Hind-part of the Head.

Chap. 11. Of the Inside of the Ear.

Three Cavities of the Ears.

LET us now approach unto the internal Cave of the Ear, which has been inaccessible to the antient Physitians, and let us diligently surveigh the admirable Architecture thereof.

There are contained three Cavities within the same, disposed in the scituation and order following. The first is the ^a Concha, the second ^b Labyrinthus, and the third is the ^c Cochlea.

why the Drum is placed obliquely.

In the Porch of the Concha, is placed the ^d Tympanum, which is not green as Pauvius imagines, neither is it directly opposed to the external hole of the Ear, but stretched

stretched out slantwaies before the same, lest any smal matters should fall, or fly into the Ear, and finding the passage cleer and open, should hurt the Drum. Whether anything be fallen into the Ears, may in such as are living, and have wide Ears, be seen in the Sun, or by holding a Candle neer the same.

Now the whol structure of the *Concha* wherein three little Bones, the Tympanum; the string annexed to the Tympanum, and a Muscle are contained, are to be seen at one cast of the Eye in yong Children and Infants: The Auricular Apophysis, which is then an *Epiphysis*, being pluckt away with the point of a Pen-knife; which must be done within the Skul.

But in grown Men, which are come to maturity, all these cannot so well be seen and demonstrated, because whiles the *Os Lithoides*, is cut up towards the hind-part of the head, it is impossible but that somewhat appertaining to the internal structure of the Ear, should be pulled in pieces.

And thus you shal break the *Os Petrosum*, the Marrow of the Brain being taken away, and the Ear pluckt up by the Roots, and the circumjacent flesh being removed.

The *Os Lithoides*, comprehending the *Ædifice* of the Ear, you shal cut asunder with very wel-steeled, and extream sharp Knives, beginning at the external passage.

Then having pulled back the vaulted roof of the Ear, that is to say, having taken off the upper part of the *Os Lithoides*, you shal see the three little Ear-bones, viz. The *Malleolus*, or Mallet; the *Incus*, or Anvil; and the *Stapes*, or Stirrup.

The Parts of the Concha.

The way to shew the parts of the Ear.

The Mallet, Anvil, and Stirrup.

^a T 20. f 7. B. &c. ^b f 9. B B. ^c f 9. A A. ^d f 4, 5. B. ^e T 8. f 6, 7, 8. &c. ^f T 20. f 7. A. ^g f 7. B. ^h f. 7. C.

Then you shal see the Drum with its string, and smal Muscles fastened to the little bones, both within and without the Drum; which are indeed more plainly to be seen in other living Creatures, than in Men.

For in Men you can discern only one Muscle, which is seated on the left side of the internal Eare towards the hind-part of the head, being fastened to the little head of the Mallet or hammer.

The Muscles

But there are found two Tendons, or rather Ligaments; one which staies the tail or handle of the Mallet; and a second which is fastened to the upper corner of the Stirrup.

the Ligaments.

A string, or little Nerve, is stretched out upon the Mallet, that it may hold and stay the Mallet upon the Drum.

The Drum-string.

Moreover, in a Skul newly boyled or dried, you may discern the three little Ear-bones within the *Concha*. If you shal peep in fore-right into the external passage, and hold your Eye close, with benefit of a cleer day-light, or of a Candle, you may draw the said little bones every one of them out with a pin.

Chap. 12. Of the Clavicula.

The *Clavicula* in its Articulation to the Sternum, has a soft Cartilage, or Gristle interposed, that it might more easily give way, in motions of the Arm and Shoulder-blade.

The Gristle of the Clavicula.

You shal observe why it is formed after the manner of an Italian S. The *Claviculae* are tied and fastened together, by the Mediation of a strong Ligament.

Its Ligament.

Chap. 13. Of the Breast-bone.

The Sternum, or Breast-bone, is in persons come to yeers, of a bony substance, but different in Nature from the rest of the bones, because it is of a reddish color.

^a T 20. f 4, & 5. B. ^b T 21. f 1. B B. f 2. a. ^c T 10. f 1. A A. T. 8. f. 2. A. M m Galen

Of how many
particular bones
the Brest-bone
is made up.

Galen will have it compounded of seven Bones, so as that the several bones of the Brest do by way of mutual articulation, answer to the several true Ribs, which *Hippocrates* seems to confirme. The Brest bone^a growing together in it selfe, has oblique discriminations, there where the Ribs are fastened unto it. Howbeit in persons growne up, there are three, seldom four divisions remaining in the Brest bone.

Valverda saies that the Brest-bone is compounded for the most part of six or seven bones, which in elderly persons, do so grow together, that it seems compounded, only of two or three Bones.

Sometimes also, though very seldom, it consists of eleven bones, as I saw at Rome in the yeare 1554. in a girle about seven years old, this bone divided into fixe bones, of which the five last, were cut from the bottome to the top, through the length of the Bone.

Bartholomew Eustachius ads, how that it many times falls out, which none has yet observed, that the Bones of the Brest-bone, the first and last excepted, viz. all the middle ones, or at least some of them, are divided by a most evident line, sometimes streight and sometimes crooked, through the middle longwayes: by which meanes it comes to pass, that the Brest bone is reckoned to consist frequently often nine, seven, or eight bones.

The Hole of
the Brest bone.

Sometimes the Brest-bone is peirced through the middle with a large Hole, which was observed by *Sylvius* and *Eustachius*, being ordained for the tranſmitting of Vessels. I have my selfe often observed the same, especially in women.

In one woman the hole was so large, on the inside of the Brestbone, as that a man might put his little finger into it, and her Chest did consist of thirteen ribs on each side.

^a T. 10. f. 2. A. A. T. 8. f. 2. A.

Nicolas Massa brags that he was the first observer of that Hole in the Brestbone, that somewhat might thereby breath forth of the *Mediastinum* and the neighbouring parts of the Brest, or rather to give passage to the *Vena Mammaria* which is spread and branched forth into the Duggs.

In large-dugd and corpulent women, their larg dugs being removed, I have observed the Brest-bone to be sharpe and the Brest narrow, which was the Cause of shortness of Breath in such women, the which narrowness of Brest was caused, by the weight of their Duggs.

The Natural
shape of the
Brest-Bone.

That representation of the Breastbone as branched or jagged, is not true nor natural: for the Brest-bone according to *Galen* resembles a Dagger or sword, whereupon the whole Bone, is by some termed *Xyphoides* or sword-like bone.

The Griftly^a Branches being taken away from either side, which are parts of the Ribs, the Hilt of the Dagger or sword Handle, will be in the upper part, and its point in the Cartilago^b *Xyphoides*.

Of the Carti-
lago Xyphoides

The figure of which *Swordlike Gristle* or *Cartilago Xyphoides*, by such as are diligent observers, is found to be various: for sometimes it is single and triangular, sometimes it is double, and like the Herb *Hippoglossum*, Horsetongue or Tongue wort. It has the larger part resting upon the smaller: sometimes it is tripartite and resembles a Trident; and other whiles it is bipartite resembling a fork or Rake.

Nicolas Massa saies that the Barbarous writers call it *malum Granatum*, the Pomegranate, as resembling the flower of that Apple.

Its Use.

Galen conceives that it is placed there to defend the stomach and the Septum Transversum. But because the stomach is far distant there from, it seemes to be framed only for the midriffs sake, or rather to hold up the Liver, fastened thereto by a ligament.

Its Hole.

Amatus Lusitanus, in the 95. Cure of his first Centure, observes that the Cartilago Xyphoides is bored through for perspirations sake, that the filthy vapors of the stomach might by that hole breath out; which is a simple Conceit.

^a T. 8. f. 2. CC. ^b T. 8. f. 2. B.

For unless the Cartilage is bipartite, it is perforated, to give passage for the vena mammaria interna, and in wounds if there be no hole in the Brest-bone, it is found in the Cartilago Xyphoides.

This Cartilage being pressed down and crooked in, does so hurt the Liver being seated beneath it, that infants are by that means killed with an Atrophy or Consumption, and in grown persons it causes perpetual vomiting, until it is reduced to a natural posture.

Its crooking

Chap. 15. Of the Ribbs.

Every Rib does consist of a twofold substance, the one of which is a bony, which makes up the greatest part of of the Rib; the other is b gristle, of unequal length, which is joined to the Brest-bone, by that sort of Articulation which is called Arthrodia, that in the rising and falling of the Chest, it may yeild more easily. But they have another articulation with the vertebras of the Back-bone which is twofold in every Rib.

Twofold substance of the Ribbs.

Now there are seven, which are called true and perfect Ribbs, because they are joyned to the Brest-bone by way of Arthrodia; unto which sometimes an eighth is added, which has been found more than once in the dissection of some bodies, being fastened to the Roote of the Cartilago mucronata.

The true Ribbs

And this is the Cause why Aristotle, whom Plinie thought it no disparagement to imitate, has reckoned up sixteen true Ribbs.

The five lower are called d Bastard and Imperfect Ribbs, because they do not reach unto the Brest-bone, but are terminated in a long Cartilage which is reversed upwards, and so grow one unto another.

The Bastard Ribbs.

a T. 8. f. 2. 1. 2. 3. &c. b T. 8. f. 2. C C. c T. 8. f. 2. 1. 2. 3. 4. 5. 6. 7. d T. 8. f. 2. 8. 9. 10. 11. 12.

Chap. 16. Of the Back-Bone.

The Musculous flesh wherewith the Back-bone is covered being removed, its admirable figure is easily discerned, which is partly streight and partly oblique, sometimes bending inward and sometimes outward, which Hippocrates first discovered, and Duretus, Hippocrates his Ghost has described in Coacis.

The shape of the Back-bone.

Every where between two vertebras, a thick cartilage is placed in the middle like glue. Galen in his Booke de Ossibus, writes that it is an hard and in some sort Gristle Ligiment.

The Gristles of the Vertebras.

All the vertebræ or turning Joynts of the Back, are covered on the outside with an hard membrane; and within they have a strong membranous ligament, drawn along from the highest vertebra as low as to the Os sacrum, which is there placed and wrapped about (besides two other membranes) to defend and preserve the spinal Marrow.

Their Membranes.

I have often found in bodies that were hanged and burnt, and have been informed by the Executioner, that it is a ridiculous fable, which the Cabalists relate of a certaine Vertebra, viz. that in the Back is found a certaine Vertebra which they have termed Luz, out of which as from a seed, the Bones shal be regenerated and spring up at the General Resurrection. This Bone Luz so called; Cornelius Agrippa and Vesalius will have to be in the foote.

A fable of the Cabalists touching a bone which they call Luz.

Howbeit Hieronymus Magius in his fift Booke de Exustione Mundi, relates that Adrianus learned experimentally of Rabbi Joshua Ben Anime, that the foreaid Bone is one of the Vertebra's of the Back.

For he found in the Back bone, one bone that a millstone turning upon it would not breake, the fire could not burne it; the water would not dissolve it, and at last being layed upon an Anvil and smitten with a sledge or smiths-hammer, it was so

far from being broken in the least, that the Anvil was crackt and the sledge broken the Bone receiving in the meane while no detriment. Which is as false as false can be. For all the Vertebrae, may be broken in peices, burnt and reduced to ashes.

Whence we may judge, what credit is to be given to the Cabalists, who in things manifest, do so impudently mock and abuse us.

*The structure
of the Loines*

If Aristotle had observed the structure of the eleventh or twelfth vertebrae, he would not have written in his third Book *de part Anima*, That the Back is fleshy, but the Loines without flesh, because the Bending-places of all parts are voide of flesh.

But the Loines are more fleshy than the Back. But the Articulation of the twelfth vertebra is different from all the rest, being the Cause of all Motion which is performed thereupon, for both above and beneath, it receives, and is not received, as is observed, in other Articulations of the Vertebrae.

From the Loines you shall descend to the *Coccyx* or *Crupper-Bone*, and you shall observe its structure consisting of three bones, its spongy reddish substance and triangular shape.

Which Part we read does in some Nations sprout out like a taile. *Pliny* records in the 22. the Chapter of his seventh Book, that in India there is a race of Men that have hairie tails, and are incredible swift. And *Paulus venetus*, in the 28 Chap. of the fifth Book of his Travells, does avouch that in the Kingdom of *Lambri*, there are men that have tails like doggs a span long: who dwell not in Cities but in the Mountaines.

The *Nubienstan Arabick Geographie* mentions a tailed Nation, in an Island of the Eastern seas which is called *Namaneg*. Page 70. I suppose that it is but a fable which Historians relate touching the *Kentish-long-tails* in England, how that God to revenge the Injury done to *Tho. Becket* the Archbishop of Canterbury, caused Tails to sprout out of the *Kentish Crupperbones*.

When the *Crupper-bone* suffers a Luxation inwards, a man cannot (according to *Avicen*) draw his Ankles, towards his buttocks, neither can he bend his Hams, which is confirmed by the Experience of *Ambrosius Pareus*. This Impediment is caused by compression of a very thick nerve seated on the hind-side of the Leg, which creeps along neare the *Crupper-bone*. The said bone is easily reduced, by a mans finger put into the fundament.

*The way to
dissect the ver-
bra's of the
Back.*

In the next place you shall fall to dissect the Vertebrae of the back, that you may contemplate the admirable fabrick of the spinal Marrow, viz. how in the extreem parts thereof the nerves are parted, ending in the shape of an Horse-taile; by reason of millions of little nerves woven together, which being agitated in water and dishevelled, do express the shape of an horses taile.

Now you shall dissect the Vertebrae in this manner; Having taken away all the ribs at their joynts, you shall fasten the Back-bone to the table with two iron hooks above and beneath your section, as joiners are wont to fasten their boards. Then with your incision knives you shall forcibly cut on every side about the conjunction of each Vertebra, in order cutting off every vertebra, with their oblique apophysis which helpe their articulation, til you come unto the *Os sacrum*. This is a painful work; but he that would eate the kernel, must of necessity crack the shell.

Before the fistula *ossea* be cut off to discover the spinal marrow: a few things are to be premised touching the natural constitution of the spinal marrow, and the Origination of the Nerves.

*The Natural
constitution of
the spinal mar-
row.*

The *Spinal Marrow* springs from the Braine and pettie-braine, and though it appeare like the marrow of the Braine, yet is it in some things unlike, because softer and besides its two membranes propagated from the Meninges, wherewith it is inclosed, it is incompassed with a third membrane strong and nervous, which hinders the spinal marrow from bruising or breaking, when we stoop or any waies bend our Backs. I am not certaine whether or no, that same membrane which is propagated from the *Crasa Meninx* have any pulsation: nor whether the spinal marrow be divided into two cavities according to the length of the back-bone as far as the loines. Certaine it is, that the spinal^a marrow descending by the^b fistula *ossea*, grows continually

continually harder, and smaller, til it come unto the Loines, where it spends it self into little cords, and springs resembling an horse-taile; that in that part where it suffers violent motions, it might be out of danger of breaking.

The Nerves of the spinal Marrow are made up of divers little threds, fastened one to another, and contained in the tenuis Meninx: which little filaments or thred-dy substances, do rise so much the higher, by how much more the spinal marrow descends.

And that nature might by all meanes possible provide for the security of the Nerves; when they come forth of the holes of the vertebrae, she has compassed them about with a thick substance, which does so closely and firmly knit and bind together the fibres of the nerve, that they cannot be drawn asunder one from another.

Its Original.

After which knot and egress, they are easily separated. But I beseech you observe the cunning Industry of Nature in the going forth of a nerve. Which that it might be less subject to rupture, seeing that it is as yet cloathed only with the tenuis Meninx, she has not drawn it through that hole which is nearest its original, but through a lower, which when the nerve has passed, it does not go unto the next rib, but descends to a lower, which when it has reached, it is divided into two, and turns back the lesser branch towards the spina, and carries the greater to the fore parts.

Progress.

^a T. 18. f. 5. A. ^b T. 2. f. 2. a. &c. ^c T. 18. f. 2. o. ^d T. 24. f. 9. &c. 10 &c.

It is a Question amongst Anatomists how the Animal faculty can with the spirit be carried through the Nerves into the whole Body; because in none of the Nerves except the optick, there is found any hole or pore or spongy substance; but we find them all solid, woven together of many small threds according as the Bulke and magnitude of every one requires.

How the animal spirit is carried through the Nerves?

Cæsalpinus in his 5 Book of Peripaterick Questions, supposes that those little threds are a multitude of small veines and Arteries, which make up one body as it were a fagot, being continuations of the Branches of the Rete mirabile, which may be imagined, but cannot be demonstrated: or at least that between the little membranes of every nerve, a very thin animal spirit is diffused which runs swiftly to the utmost parts of the limbs.

But I see not how Cæsalpinus can demonstrate such a continuation of the Rete mirabile with the Nerves or the spinal marrow.

Out of the spinal marrow ^a 28 pare of nerves do take their Rise, seven out of the Neck; twelve out of the Back; five out of the loines; foure from the Os sacrum, the branches whereof to search out, is a weariyome peice of worke, and must be done in a dead body provided for that intent alone, and with diligent Inspection.

How many Nerves proceed from the spinal marrow.

^a T. 18. f. 1. D. 1. K. &c.

The medicinal Consideration.

The dignity of the spinal marrow with reference to the necessity of Life, is equal to that of the Brain, and therefore Hippocrates termed it *Aion*, because he believed that the vitality of the animal was placed therein: as Erotianus proves in his *Onomasticon* and after him Foësius in his *Oeconomia Hippocratis*.

The Dignity of the spinal marrow.

Plato in his *Timæus* does acknowledge the spinal marrow to be the foundation of Life Beneath the Head, and Hippocrates himselfe teaches that men have most grievous sicknesses and hard to cure arising from the marrow of their Back: for a fluxion thereinto causes a consumption, and its drying up and withering is a greivous disease, and a Man dies if the marrow of his Back be wounded. In a word, Hippocrates in the 2^d of his *Predictions* saies that if the spinall marrow be diseased, either by reason of a fall or upon any other occasion, or its owne accord, the Patient becomes both lame in his Thighs, so that he feels not when he is touched; and also in his Belly

and bladder impotent, so that at first he voids neither Urine nor dung, save upon meer necessity: but when the disease growes older, both dung and Urine come away of themselves, without any forcing of the Patient, and a short while after he dies the death.

From a flux into the Back-marrow an hidden and undiscernable Consumption arises: but when it flows back into the Vertebra's and the flesh, a Droptie is ingendred, so saies Hippocrates in his *Book de Locis in Homine*. How the consumption of the Back proceeds from the Marrow, the same Hippocrates does accurately teach us in his 2^d *Book De Morbis*.

The natural figure of the Back-bone.

Before we declare the Diseases of the *Ossea fistula*, I must shew you the natural figure of the *spina* or Back-bone; which is *Ithuscolicus* streight bow'd through the whole length of it: but in the Neck and Loyns it is *Ithu-lordos* streight bowed inward, in the back it is *Ithu-cuphis* streight bowed outward, and therefore it is easie to declare the diseases which vitiate the Backbone, such as are *Lordosis*, *Cuphosis*, *Scoliosis*, and, *Seisis*.

Diseases of the Back-bone. Lordosis.

Lordosis, is a disease of the Backbone, when the vertebrae thereof, are out of their place, and turned inward or forward.

Cuphosis

Cuphosis, is a disease of the Backbone, when its Vertebra's are disappointed and turned outwards or backwards.

Scoliosis.

Lordosis happens in the Back, as *Cuphosis* in the Neck and Loins.

Scoliosis is a crooking or wreathing the Backbone to one side.

Seisis.

Seisis is such a Commotion of the Vertebra's of the Backbone, as that they remaine indeed in their places, but so as their frame and fashion is disordered.

The cause of Scoliosis.

Scoliosis is the Inclination of the Back-bone to one side or another, when we goe, depends upon some fault in the twelfth Vertebra of the Back, where the motion of the Back-bone, is performed.

This Vertebra is received by its Neighbours above and beneath, and does not receive, as all other Vertebra's doe beside.

For it is Joynted not by way of *Gynghimus* but by way of *Arthrodia*; and therefore if its Apophyses either upper or nether shal be depressed; it cannot sustaine the Trunke of the body bolt upright in motion, but it must of necessity leane to one side or another: and this fault comes to People when they are Children, either being brought into the world with them, or caused by ill carrying, or by reason of the softnes of those Vertebra's while the Child is forced to use its Legs, sooner than is fitting.

I have shewed another Cause of halting according to Galens doctrine in my Chapter of the Thighs. Those two Causes of halting are irreparable and incurable. The Luxation of the second Vertebra of the Neck, causes a squinzie, which in few hours does choak the Patient, because it cannot be restored into its place.

The diseases of *Os sacrum* are of great Moment, whether they be tumors or ulcers, by reason of its natural constitution, the whole Bone being in a manner spungie, fistulous, and perforated within and without: and therefore when this Bone is Diseased, the Patient is in danger of his Life, as Hippocrates observes in his *Book de Glandulis*.

In his third book *De Fracturis* he gives us to understand, that the *Os sacrum* being exulcerated, is not cured without very great difficulty, which Galen also confirms in his Comments. Langius in his Epistles, relates, that he saw two gallant Gentlemen worne away with incredible raging pain, their *Os sacrum* being putrified: so that in conclusion they consumed away and dyed.

Chap. 16. Of the Scapula.

Its Articulation with the Brachium.

Having diligently Viewed the trunk of the Body, you shal proceed unto the Limbs; and you must principally observe the Articulation of the ^a Scapula or Shoulder-blade with the ^b Arme, which is made by the way of *Arthrodia*, by the coming

coming between a most thick and nervous Ligament, which does round about embrace the whole Joynt.

Also four muscles viz: the ^c *Supraspinatus*, ^d *infraspinatus* the ^e *Rotundus minor*, ^f *Subscapularis*, doe with their broad tendons incompais the said joynt.

The Cavity of the ^g Head *Omucope*, being not sufficiently proportioned to receive the Shoulder: which was so contrived to make the motion more easie and free, but it is augmented with a Gristle which crowns the Lips of its Cavity.

Then you shal discover under the ^h *Deltoides* a broad and remarkable Ligament, which reaches from the Shoulder-tip as far as to the *Coracoides Apophysis*, that it may hold in the Arme aloft, to prevent Luxation upwards.

Afterwards you shal observe the extremity of the ⁱ *Clavicula* articulated with the Shoulder-tip or *Acromium*, which is therefore termed *Catapleis*, although *Galen* in the 12. Chapter of his *Book of the dissection of Muscles*, does call the first upper Rib by that name, because its placed beneath the *Clavis*. *Ruffus Ephesius* calls the *Acromium*, the coupling-band of the *Clavis* and *Scapula*: but *Eudemus* saies that it is a very little Bone, which in children is a most exact gristle, which though in process of time it degenerate into a Bone, yet until they be 18. years old, it retains much of the substance of a gristle contrary to the nature of all the other bones. Some whiles it grows so highly together with the spine of the *Scapula*, that in a person of middle age wrastring or exerciseing, it may easily be seperated, which happened to *Galen*, as himself tells us in his first *Book de Articulis*.

The like accident he observed in another, as he relates in *Comment. ad Part. 1. Sect. 1. de Officina*. *Hippocrates* himself takes notice of the Luxation of this Bone, in his *Articulis*: where he saies that the *Acromium* or shoulder-point is of a different nature in mankind, from that which it is in other Creatures.

T. 21. f. 1. A. ^b T. 21. f. 1. C. ^c T. 22. f. 3. A. ^d T. 22. f. 3. B. ^e
T. 22. f. 1. & 3. C. ^f T. 22. f. 1. D. ^g T. 21. f. 2. c. ^h T. 22. f. 1. A. ⁱ
T. 21. f. 2. ^b

Upon the Neck of the scapula rests an ^a *Apophysis* which in children is an *Epi-physis*: from the likenets to a Crowes bil or an anchor, it is termed *coracoides* and *ancuroides*. It prohibits the shoulder from slipping out on that side, according to *Galen* in *Com. in part 1. Sect. de Art*; and therefore it was framed for the security and strength of the Articulation.

For when the Actions of the Hand and arme are forwards, the shoulder would easily be unjointed, unless it were retained by the *coracoides*: and therefore the laxation of the shoulder is seldome towards the fore part; *Hippocrates* did observe it once, and *Galen* saw it five times at Roome, as himself relates in his *comment: ad Part. 4. Lib. 7. de Articulis*.

Now the pars of the *Scapula* he thus distinguished: as much of the whole *Commiffure* or Joynting, as is subiect to the sight he caled *Omos*; & that part which is under the knitt ing of the shoulder, he caled *Epome*, which we terme *Acromion*: and that broad part of the *Scapula* which is scituate behind, and is covered with muscles, is by *Galen* termed *Omoplate*.

From this place we may gather & fish out the Interpretation of an obscure passage in *Cornelius Celsus*, in his eighth *Book*. Again from the Neck two broad bones on either hand doe goe unto the *Scapula*, our Countrymen call them *Scoptula operta*, the Greeks terme them *omoplatas*, *Celsus* calls them *Scopula operta*, because they stick out like boughs of Trees, and are scituate in the upper part of the Chest. For the tops of Mountains were by the ancient Latins termed *Scopula*, which *Tertullian* in his *Book de Pallio*, calls *Montium Scapulas*. Also the final branches of trees were called *Scopi*, hence the phrase *Vvarum scopi* vine branches used by *Varro* in his first *Book de R: Rustica*. *Cato* speaks of *Scopulae myrti* Myrtle branches.

It is worth observation which Women by long experience have learned viz. that broad shoulderd Men doe for the most part beget great Children, because they are very hot hearted. And *Galen* saies in his *Ars parva*, that by how much the Heart is hotter

Its Muscles.

Its Cavity:

Its Ligament.

Its Articulation with the Clavicula.

The use of the Apophysis coracoides.

The parts of Scapula how named by Galen.

By Celsus

whether broad shoulderd Men beget large children.

ter, by so much the Chast is larger. And therefore *Forestus* his wives Mother, would not marry her daughters to broad breasted and broad shouldered Men: for she was afraid least they should die in their travil by reason of the largneis of their Children, which *Forestus* saies he had often seen come to pass in the 70 Observation of his 28. Booke.

why french
maidens have
their right
shoulder higher
than the left?

The Cause of this is as hard to assigne as of another inconvenience, with which the young maidens of *France*, especially the Gentry are infested: Whose right shoulder is frequently higher and fuller than their left: so that among an hundred virgins you shal hardly find ten that have wel proportioned shoulders.

Whether it is caused by the more frequent and stronger motion of the right arme, whereby the shoulder blade is widened, and raised up, by meanes of the interjacent muscles lifting themselves up. Ad thereunto that in persons that are growen up; their right shoulder is more heavy than there left, if we beleieve *Amatus Lusitanus* in the last Cure of his 4 Centure.

why so few
that can use
both hands a-
like?

Why is the right Hand stronger than the left? and why are there so few Ambodexters that can use both hands alike? Is it because the Lungs and Liver doe incline more to the right side than to the left? Or is it because Nurses when they teach children to go, do draw them on by their right hand.

Is it because Mothers would make their daughters low shouldered while they study to make them smal and waspe-wasted? For as *Terence* long since said, if a Girle have a good habit of Body and burnish a little, they say she is a champion or wrastler, and therefore they pinch their bellies and withdraw their food, and though naturally of good constitutions, they never leave tampering til they make them like Bull-rushes; mere waspe-wasted *Rush Candles*. Which is done, not without manifest detriment to their Health; whiles by the overgreat pinching in of the lower part of their Chest, the upper parts thereof are enlarged, whence proceeds that lame sticking out of their shoulders, or from contortion of the Back-Bone, its natural shape is viciated and depraved.

Chap. 17. Of the Humerus, Cubitus and Radius.

The shoulder-
hole.

In all shoulders about the middle and inward part towards the Ribs, there is a manifest open hole tending downwards, and evidently percing into the substance of the Bone, through the which a remarkable veine does insinuate it selfe into the Cavity of the Bone, that it may nourish the inner Marrow; whence it comes to pass, that the whole marrow of this Bone appeares bloody when the Bone is broake.

Its Ligament.

The Articulation of the ^a Brachium with the ^b Cubit, is fastned and incom-
passed with a membranous and nervie Ligament.

why the Ra-
dius is joined
to the Cubitus?

The ^c Radius is adjoined to the Cubit, that it might direct the oblique motions of the Arme, which are performed downwards and upwards, which motions, having taken away the Muscles, you may observe, by turning the Radius to and fro backwards and forwards.

why they part
one from ano-
ther?

The ^d Cubitus and the ^e Radius, do in the middle way part one from another, that the Radius in a semicircular motion, might be more freely moved, and that a larger feat might be afforded for the muscles, which in that part are many.

^a T. 21. f. 1. C. ^b T. 21. f. 1. D. ^c T. 21. f. 1. E. ^d T. 21. f. 2. c. ^e T. 21. f. 2. d.

why a Liga-
ment is inter-
posed?

Between this space there is interposed a membranous ^a Ligament, by helpe of which the Cubitus and Radius are more nearely and straitly combined, and the interior muscles are separated from the external. It helpes also the equality of their motion, that both might be bent, or stretched outright at one and the same time.

Their Arti-
culation with
other Bones.

These two Bones, are in their extremities fastened together, by a very different joint; above, the Cubitus receives the Radius, but beneath, the Cubitus is recei-
ved

ved by the Radius, the Bulke and thickness of the substance being changed. For the Radius is at the wrist thicker, that receiveing the greater part of the wrist, it might more conveniently move the same by an oblique motion. But the Cubitus at the Brachium is broader, because that bone alone is articulated with the brachium; the Articulation of the Radius with the knob of the Brachium, is thin.

Lastly you shal observe, whether or no the Styloides^b apophysis of the Cubit do touch the wrist, being fastened thereunto by way of a joint. Hippocrates observed the external part of the Cubit to be dislocated, in *Lib de Artick*. Which kind of Luxation Dalechampius observed, as himself avers in his *Comments* upon the *Surgery* of Paulus Aegineta.

They who deny that the Cubit in a Man does touch the wrist, do alleage that there comes between them a thick and moveable Gristle, which fills that space; and in very deed that same Cartilage or Gristle, seemes to be adjoynd by way of a supplement.

Chap. 18. Of the Wrist.

The^c wrist and^d Radius, are joyned one to another by a nervous Ligament, which infolds the Articulation.

Moreover another^e Nervous ligament, is observed, being shap'd like a Ring, which compasses the wrist round about, which containes within it the tendons (which are carried through the cavity of the wrist, and which lie upon the back of the wrist, saveing some particular ones: howbeit on the outside it seems smal.

^a T. 22. f. 2. e. e. ^b T. 21. f. 1. ^c T. 21. f. 1. F. F. ^d T. 21. f. 1 D. E.

The Wrist^a bones are eight, disposed into two orders or rankes.

The first order consists of three bones.

The second is made up of foure bones. The fourth bone is over and above, out of ranke and order; but we may with Sylvius refer it to the first order, Seeing it rests upon the third bone of the first order. Howbeit Vesalius accounts it a sesamoidean bone, because in this place it fills an empty space. But how can it have the use of sesamoidean, seeing it is not interposed between Bone and Bone? It hangs over another, that it might forme that cavity, which is in the inner part of the wrist, and to this bone the Muscle Cubiteus flexor carpi does adhere.

Number of the wrist bones.

The three wristbones of the first order, being joyned together, do make a cavity, which receives two Bones of the second order, which being joyned one with another, do make the joints Head: whence you may know that the first order is obscurely moved with the second, and that^e the articulation is by way of Arthrodia, and in a dead body, having taken away the tendons, you may discover this motion.

Their Articulation.

The rest of the wrist bones, being articulated with the Metacarpium, do cause no motion at al, or a very obscure one. It is very rare to find nine bones in the wrist; howbeit some have found so many.

Chap. 19. Of the Metacarpium, Fingers and Sesamoidean Bones.

After the wrist follows the^b Metacarpium which is framed of five bones, if we beleive Celsus and Pyussus, whom Plinie does favour, when he attributes only two joints unto the thumb; Lib. 11. Cap. 43.

^a T. 21. f. 3. ^b T. 21. f. 1. H. H. f. 2. G.

Galen does better, who separates the first bone of the^a Thumb^e from the Metacarpium, because it is joined to the wrist by an Arthrodiarthrosis, with evi-

Of how many Bones the Metacarpium consists?

dent motion. But the bones of the metacarpium are articulated to the wrist by way of synarthrosis, without motion. Ad hereunto, that this bone is shorter than the bones of Metacarpium, is not conterminous to them; has a contrary situation and a different motion.

The Bones of the Thumb.

For the *Thumb* is termed *pollex* a pollendo, because it alone is equivalent to the other four fingers. That it might be strong and substantial, it was requisite that it should have three bones; & that it might performe manifest and strong motions, it has peculiar muscles and they are affixed unto the first Bone. When the *Athenians* would render the *Aeginetae*, their emulators, wholly unfit for warfare and Navigation, they cut their *Thumbs* off. And we call such as are castrated for their cowardize *Polletrunci*, thumb-les companions. They were by the antients in way of merriment termed *Murci*.

The *Metacarpium* therefore is compounded, only of four bones, two of which are immoveable, the other two which are under the ring finger, are manifestly moved.

In that same space where the *Thumb* is joyned to the *Brachialis*, there is a certaine cavity, in which the *Arabian Cautey* was usually celebrated, which is largely and elegantly described by *Gesnerus* in his *Appendix to the Art of Chirurgery*.

And it is no wonder if some at this day undertake to cure the venereal pox, by applying mercurial water to this part, which eates, through the skin, and petces to deep as to flux the patient.

The Ligaments of the Hand.

In the hollw of the hand, a *transverse ligament* is observed, which connects the row of fingers to the bones of the *Metacarpium*.

^a T. 21. f. 1. G. G. f. 2. H. —

The Sesamoidan Bones.

Within the palme of the *Hand* you shal find divers *Sinewy-Ligaments*.

There are a few *sesamoidan bones* found in the inside of the *Hand*. There are none in the outside. They are found hidden among the first jointings of the fingers.

The *Thumb* in its second and third joint has some *sesamoidan bones*; in the first joint it has none.

The way to find those Bones.

Now to find the *sesamoidan Bones* either in the hand or foot, you shal this do. You shal so cut out the tendons that stretch out the fingers, that you be careful not to take away the cartilages of the joints which are under them, which may seeme to be the *sesamoidan bones*.

Under these tendons, most frequently in the hand, especially in hard bodies, you shal perceive a certaine hardness sometimes gristlelike, sometimes bony. Then you shal cut crosswise the *Ligaments* of all the joints, untill you make them appeare, their inside in the hand, their outside in the foot; in which side, you shal find the *sesamoidan bones*; haveing first cut asunder the *ligaments* wherewith they are infolded, or drawing them a little back, upwards towards the roots of the fingers.

Chap. 20. Of the Os ^a Ilium and ^b Thigh-bone.

Their Ligaments.

From the *Armes* you shal proceed unto the *Inferior Limbs*.

Between the *Os sacrum* and the *Tuberous* bunching out of the *Ischium*, there intercedes a *Great and strong Ligament*.

Beneath the seame or growing together of the *share-bone* there is another *Ligament* stretched out.

And a *circular Ligament* comprehends the *Articulation* of the *Thigh* with the socket of *Os Iliij*, which being cut away, another *Ligament* somewhat long and bloody appeares.

^a T. 2. f. 3. & 4. A. & c. T. 21. f. 2. A. — ^b T. 21. f. 1. R. f. 2. C. — ^c T. 21. f.

7. a a. — T. 21. f. 7. b. —

The said bloodyness is caused by reason of certaine little veines which creepe through.

through the *Acetabulum* of the Huckle-bone.

That same Ligament which is brought out of the top of the thigh-bone, is fastened and strongly driven into a cleft which is in the foreside of the *Acetabulum*: which being relaxed, and drawn from its place, there falls out such an halting as is incurable: in which the Thigh, though perfectly put in Joint, will still slip out again.

That same *tubus Coxaria*, *Ptisis ischiadica*, mentioned by *Hippocrates* in his Book *De morbo Sacro*, and elsewhere, it is worth your observation: when by reason of an Impostume or a fluxion into the Hip-bones Cavity or *Acetabulum*, the Ligaments corrupt and putrify, and the Hip grows lank and leane. It was an ingenious observation of *Hippocrates*: all Bones vitiated, cease to grow; if the part containing be corrupted, it infects the part contained. wherefore if the Huckle-bone be corrupted, the Thigh-bone cannot remain untainted; which disease I have often observed.

The oval hole of the^a Huckle-bone called *thyroides*, from its resemblance of a door, is ascribed unto the thare. It was contrived for lightness sake, and is exactly covered with an hard membrane, which does sever the *Musculos obturatores*, which rest on either side thereupon.

That is false which *Aristotle* has written in his fourth Book of the *Live-wights* Chap. 10. that no four footed Beast has Huckle-Bones.

In the Thigh-bone you shall observe the^b shape thereof, bunching out on the foreside, and saddle-fashioned behind, for the convenience of sitting and firme walking. Which figure *Hippocrates* observes in his Book of *fractures*, and advises when this bone is broken, that care be taken to preserve the same.

For such whose Thigh-bone is straighter than it ought to be, are crook-legged, and are lame in their knee; and they cannot stand nor goe without trembling.

^a T 2. f 3. & 4. B. ^b T 21. f 1. K. f 3. G.

But they whose thigh-bones are very crooked, they stand more firmly either on one Leg or on both, than they who have straight thigh-bones.

The Neck of the Thigh-bone, is somewhat long-fashioned and oblique, that it may pass along the tendon of the *Rotator Infernus*. But *Galen* supposes it was made for that end, viz. to leave space for muscles, which were to be placed in the lower part, and for great Veins, Arteries, nerves and kernels, which are quartered neare the divisions of the Vessels.

They whose Thigh-bone is shorter-necked than ordinary, have their groins narrow and compressed, and when they walk are constrained to halt on one side, and are termed *Varii*. So says *Galen* in his third Book de *Usu Partium*.

For the Thigh-bone does contribute much to the rectitude and stability of the Body, by that same oblique Longitude of its Neck; whence the cause may be given why men naturally halt to the one side or the other, or to both sides, their Feet and Legs being of equal length; which no man yet assigned, nor observed.

The lower end of the Thigh-bone Joint to the Leg is termed the *Knee*, which is fastened by a two-fold ligament. One of them is^b circular, and compasses both the Bones round about.

The other being^c placed between the two bones, is somewhat Long-fashioned and bloodyish, through neighbourhood of such veins, as descend through the Ham into the Leg: it arises, from the middle-space of the knobs of the Thigh-bone, and is inserted into the middle Eminency of the Knobs of the Shank. Sick people often speak of this Ligament when they talk of a burning heat in their Knees.

Upon the Knobs of the Shank-bone two semicircular Gristles are fastened, which hold the same Knobs more stable, that they may not swerve, in violent motions and contorsions of the thigh. See *Galen* touching the of the Shank-bone, in its Articulation with the Thigh-bone. Lib. 2. de *fracturis*.

That Part which is opposite to the knee behind, is termed *Poples* the Ham, being empty and void. The Vessels which pass that way being removed, an empty space is observed, interposed between the two knobs, which *Pliny* seems to have understood.

Consumption of the Hip.

The oval hole of the Huckle-bone

The natural shape of the hip.

The Neck of the Thigh-bone why long-fashioned.

Ligaments of the Knee.

The void space in the Ham.

stood in the 45. Chapt. of the. 11. Book of his Natural History. In the knee it self, the conjunction of both, as well the right as the left, is on the foreside double (it should be on the hinder side) there is a certain emptiness like cheeks, which being perced, the spirit flies out as from a Cut Throat.

why wounds
in the Ham are
deadly?

Wherefore I have alwaies observed the wounds of the Ham to be deadly, not only for the dissipation of the spirit, but also by reason of cutting assunder such remarkable vessels, viz. Veines, Arteries and nerves, which creepe through that hinder part of the thigh, which being cut, inevitable death follows.


whence pro-
ceeds that sym-
pathy which
is between the
knees and the
cheeks?

The society and sympathy between the knees and Cheeks is wonderful, which is described by the Author of that book *De Ordine Membrorum*, which is tallly ascribed to *Galen*: How that the knees being affected and afflicted, the eyes con- dole and weepe, by reason of that old acquaintance of the knees and eyes, or Eye lids in the womb, where the child touches its Eyes and Suttaines them with its knees.


Chap. 21. Of the Patella.

Its connexion.

Upon the Articulation of the thigh and leg a smal bone is placed, which they call a *Mola* or *Patella*, the whirle bone of the Knee.

^a T. 21. f. 1. LL. 

It growes unto the knee, not fastened by any Ligaments: but only being a glewed to the tendons of the muscles of the shanke, it is so held close upon the knee.

^a T. 21. f. 8. d. 

Its use.

If you take a diligent view, you shal observe a Ligament somewhat bloody, which does firmly knit and bind the Patella to the hard fat which is palced beneath.

The office of this bone, is to defend the joint to guard the bowing and bending of the Part, and to render the motion more facil: for it hinders the extension of the leg from passing out of a right line; and when we sit with our knees bent, it keepes the thigh from luxation forward. And becaute the whole Body inclines forward, it hinders us from falling when we go downe a steepe Hil.

This *Galen* found by experience, in a certaine young man that was a wraistler, in whom, as he was wraistling, the Patella was disjointed, and did ascend towards the thighbone, whereupon two inconveniences followed, viz. a dangerous bending in his knee, and a trouble in going down Hil: and therefore he could not go down hil without a staf. *Paracelsus* observes in the 22. Chapter of his 14 Book, that he never saw anie that had the Patella broken, but they halted. I have seen such whose Patella was luxated and drawn upwards, who could not so easily go up hil and down-hill as formerly.

Vesalius his
opinion touch-
ing the use of
the Patella.

Notwithstanding *Vesalius* in his *Surgery* denies that the Patella confers any thing to the firmnes of the joint, and that a man does halt, when it is broken or taken out, as he avers he had found by many examples, only he saies it is placed upon the knee for to defend and secure the joint.

And he goes not much from the same opinion in his *Anatomy*, where he saies it performes the same office in the knee, which the Sesemoidean bones do in other joints.

Hippocrates in his book *de locis in Homine*, assignes another use of this Bone, namely to prohibit moisture from descending out of the flesh into such a loose joint as the knee is.

Seeing therefore the Necessity of the Patella is so graeat, I conceive it is but a fable which is reported of the Thebans, who, that they might be able to run more swiftly, took certaine Bones out of their knees.

Yet there have bin found about *Nova Zembla* certaine Pigmies or little Men, who could bend their knees backward and forward, and were so swift of foot that

none

none could overtake them, if we give credit to the relations of seafaring Men.

Chap. 22. *Of the Tibia and Fibula.*

The Tibia has two Bones, the one ^a larger and more inward, which beares the name of the whole; the other is *smaller and more external*, called ^b Fibula. But *Perone* (which is rendred *fibula*) does signifie two things in *Hippocrates*, the whole Fibula, and appendix of that bone, as *Galen* expounds it, in his Interpretation of the words of *Hippocrates*. *The reason of these names.*

It is termed *Perone* from *peiro*, which signifies to boare or thrust through. Tis called Fibula in Latine from the Greek word *phible*, which signifies smal and lank; howbeit in Latine writers of Architecture, certaine beames or joices of wood placed to give strength to other parts of the building, are termed *Fibule*. For this Bone fibula does iustaine the outer knob of the shanke-bone unto which it is fixed, because the weight of the Thigh and of the whole Body, does most of all beare upon that part.

The lower ends of the Tibia and Fibula are termed ^c *Malleoli* Ankle-bones, both being fastened together by a *strong circular Ligament*, through which the tendons of the Muscles are drawn, as was said of the wrists. *What the Malleoli are?*

^a T. 21. f. 1. M. f. 4. D. ^b T. 21. f. 1. N. f. 4. E. ^c T. 21. f. 1. I. K. f. 4 g b.

Chap. 23. *Of the Foot.*

The Articulation of the ^a Astragalus with the ^b Scaphoides is very close, so that it seems altogether immoveable, so that any man would thinke, that the foot is not moved laterally by that Articulation.

Two *Sesamoidean Bones* are fastened behind the great toe, that they might give a secure passage to the tendon of that Muscle which bends the Great toe. *The Sesamoidean Bones belonging to the Foote.*

In the Sole of the foot, you shal find very many Ligaments, by which the Bones are straitly united, that the foot might become hollow. You shal therefore observe the *Transverse Ligament*, which binds up the Bones of the Metatarsus, with the first ranke of Toe-joints, like that which we find in the Hand. *The Ligaments of the Foot.*

Chap. 24. *The number of Bones for a Skeleton.*

Two hundred thirty and two Bones are required to make a sceleron, fifteen being taken from the number, two hundred forty seven. Because the breastbone is reckoned but for one, as also the Os sacrum and the Coccyx or Crupper bone; because in the boiling and clementing of the Bones, they do not separate Neither wil the ^d Coccyx, ^e Larynx, ^f Hyoides, nor ^g Sternum endure boileing.

I omit the fixe little Eare-bones, the Os hyoides and the Larynx, because they are not joined by way of Articulation with other bones.

^a T. 21. f. 5. A. ^b T. 21. f. 5. C. ^c T. 23. f. 3. N. & c. ^d T. 2. f. 5. & 6, b. ^e T. 13. f. 9. 10. & c. ^f T. 13. f. 11, ii. & c. ^g T. 10. f. 2. AA, ^h T. 20. f. 7. A BC.

Chap. 25. *Of Breaking the Bones.*

When you are sufficiently instructed in the number of the Bones, you shal break in peices every particular bone; that you may enquire into the inner structure thereof.

The

The profit of this knowledge is evident in fractures. For hereby may be collected in how long time a broken Bone may be soldered together again. Hippocrates writes in his Book *de Alimentis*: that the nourishment of a Bone may be known by the breaking thereof. The Nose bone requires ten daies to grow together, the Jaw-bones and the clavicle and ribs twenty; the Cubit requires thirty, the Tibia and Brachium forty, and the thigh-bone fifty, little more or less as occasion serves.

Inasmuch theretore as the Quantity of a Bones nourishment, and the space of time requisite thereunto, does alwaies hold proportion to the Bones thickness: to that if the Nose-bone, that is to say the Bone of the upper Cheek which reaches to the Nose, doe require ten degrees of nutriment: the nutriment of the other Jaw-bone of the Ribs and Jugular, which are twice as thick as the Nose-bone, must be double in proportion to the nutriment of the other, and will require twice as long time to grow together which is known by their breaking, or by the Cure of their respective fractures.

And therefore by how much thicker the Bones are, by so much the more nourishment, and the longer time they require to be soldered together; so that suppose the Nose-bone require ten parts of nutriment, and the Nose being broken shall need ten daies time to grow together: the Aliment of the ribs, Jawbone and Jugular, (which are twice as thick) must be double in quantity, and they shall require twice the time (being broken) ere they can grow together again.

And the Cubit-bone, because it is thrice as thick as the Nose-bone, therefore it will need thrice as much nutriment, and thrice as long time to grow together.

The Tibia and Brachium because they are four times as thick as the Nose-bone, will require four times as much nutriment and four times longer space to grow together.

Finally, the Thigh-bone being five times as thick, will require five times as much nutriment, and five times as much space to grow together, after they have bin broken.

Cellus writes in his seventh Book, out of Hippocrates, that between the fourteenth and twentieth day the ^a jaw-bone, ^b Cheek-bones, the ^c Jugular, ^d Breastbone the ^e Shoulder-blades, the ^f Ribs, the ^g Back-bone, the ^h Hip-bones, the ankle-bones, the ^k Heel-bones, the ^l Hand, and the ^m Foot-sole are healed. between the twentieth and thirtieth daies the ⁿ Thighes and ^o Arms: between the seventh and twentieth and fortieth the ^p Arm-bones and ^q Thigh-bones are healed. the sense of which place cannot be understood, but by consideration of the threefold cavity and marrow of the Bones.

A Threefold
Cavity in
Bones.

A Threefold
Marrow.

For I find a threefold marrow contained in the Bones in three different Cavities. The marrow of the greater bones as of the Arme and Thigh, is reddish: the marrow of the middle sized bones which are hollow in some good measure, is white. The rest of the bones being of a spongy substance, or full of little Cavities, are replenished with marrowy Juice, but not with red marrow.

^a T 15. f 3. L. ^b T 15. f 1 E. ^c T 21. f 1 B B. f 2. A. ^d T 10. f 2. A. & c. ^e T 21. f 2. B. ^f T 10. f 2. & 3. ^g T 13. f 19. T 10. f 2. & 3. T 2. f 1. ^h T 2. f 3. & 4. & c. ⁱ T 21. f 5. A. ^k T 21. f 5. B. ^l T 21. f 2. G 1. ^m T 21. f 4. G H. ⁿ T 21. f 1. M N. ^o T 21. f 2. D E. ^p T 21. f 1. C C. ^q T 21. f 1. K K.

Howbeit the inferior jaw-bone is hollowed in the base, and in the Chin it is of a stony hardness, it contains red marrow, which does not fluctuate from one end of the Jaw-bone to the other, because of the hardness and solidity of the jaw-bone in the Chin. Whence it is easie to be demonstrated that the *Maxilla* is a double bone.

The *Clavicula*, which Galen writes is fistulous, we find to be every where of a spongy substance. The Ribs, the Vertebrae, the shoulder-blades, the Hip-bones, the Tarsian and Metatarsian bones, also the wrist and after wrist-bones, are spongy and like Pumice-stones. The bones of the fingers are hollow and contain a whitish marrow. In the Feet, only the great Toe is fistulous or hollow-bon'd.

Chap. 26. The Collection and ordering of Bones
for a Skeleton.

But if you are not minded to breake the bones, but desire to preserve and pre-
pare them for a sceleron. You shal observe that there are two things required there-
unto; first the purifying and clensing of the bones, secondly their apt uniting and
fastening together, which may be termed *Sceleto-pæia*. Two parts of
this worke.

As for what concerns the clensing of Bones, Scaliger in his Exercitations observes,
that the stone termed *Sarcophagus* does in a short space eat off and consume the
flesh from the Bones. And so the bones remaine bare and naked. The Clense-
ing of the
Bones.

Pausanias in *Eliacis* relates that the Divel *Eurynymus* eates off the flesh of
dead People, so as nothing but the bones remaine.

The Jewes imagine that there is an internal Divel named *Azazel*; who in *Levi-*
ticus is named *Princeps desertorum*, and eates and devoures the flesh of the dead,
leaving only the bones behind.

But we are not wont to use the stone *sarcophagus*, because we have it not;
neither are we acquainted with its operations. Neither do we use the assistance of
the Divel *Eurynomus*, because we desie and execrate those wicked spirits.

Wherefore having cut the Bones one from another and taken their flesh off, you
shal cast them into a large Kettle or Caldron, except the Brest-bone, the Hyoides,
and *Coccyx*. Then fil the Caldron with scalding water, so as to cover all the Bones
and set them on the fire and boile them foure or five houres.

You shal be careful while they are boiling that no bone stick out, so as to be
fainted by the smoak.

Also you shal ever and anon take off the scum and fat which swims aloft, that the
Bones may be the more neat and cleane.

Which that it may be more effectually performed, you shal perce the larger
bones that are ful of Marrow, in the Head with an Awle that all the superfluous
marrow may flow and soake out.

You may throw away the first water and boile them in a second, that all the mar-
row may be drawn forth.

Then take them out while the water is hot (for if it be cold they wil be greasie)
and scrape and clense them with a smal knife.

Some, while they are boyling, throw in a pound of Lime or Chalke, to make
them the whiter, but this eates off the *Epiphysies* and the *Gristles* which do crust
the extremities of the Bones; which you must take heed you pul not away, when
you scrape the Bones.

Then you shal put the Bones againe into most pure water boiling hot, and boile
them for an houre, that all the marrow and fat may be separate and exhausted. After
that cast them into cold water, and take them out and wipe and rub them wel with
course linnen cloaths.

When the Bones are thus prepared, many lay them two or three moneths in the
open aire to bleach and grow white. Others put them into a wooden case, bored
ful of holes and hang them in a running brooke, or in the streames of a swift River,
that the rubbing of the streame may whiten them.

I had rather lay them under the falling of a Mil-stream for the space of ten or
twelve daies.

Bellonius in his *Book de Admirandis*, relates that he saw in the shoare of
Bononia in *Picardy*, an innumerable company of exceeding white bones of Bodies
which had been drownd and cast out upon the shore having been buried in the Sea
sand. He saw the like by the Red-sea, so that the bones so prepared, and sticking
and growing together by their nerves and Ligaments, are exceeding neate, and cleane
and whiter then Snow. Such as were those two Sclerons which *Galen* had to serve
him in Anatomy. *Bellonius* observes in the same place, that dead bodies are pre-
served.

terved from corruption if they be anointed with the Balme that drops out of Cedar trees; also that bones moistened with the same juice remaine uncorrupted.

The Bones accurately clenfed and dried, you fhall preserve in a Chest, or you may fasten them together with brasse-wire, and so keep them standing in a Case. It is needful that you have bones both waies, viz. single and united. And the truth is, as *Vesalius* has rightly observed, the Bones united serve more for ostentation than Instruction.

*The manner
of fastening the
Bones to make
a Skeleton.*

Moreover by long boileing, first in water, and then in oile, al the Bones of the Head and of the upper jawbone are easily separated, as I have often observed: and by this meanes you may have them severed one from another, that you may view and measure the size and dimentions of every one. The manner of fastening the bones together, depends either upon the Industry of the Artift; or it is done by imitation of another Sceleton neatly composed. You may read more of this subject in *Vesalius* and *Columbus*. Also *Carolus Stephanus*, has noted some things upon those Authors, worthy of Consideration.



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The Names of several Books printed by Peter Cole at the sign of the Printing-press in Cornhil neer the Royal Exchange.

Eleven several Books by Nich. Culpeper, Gent. Student in Physick and Astrologie.

1 *The Practice of Physick*, containing severteeu several Books. Wherein is plainly set forth, *The Nature, Cause, Differences*, and several sorts of *Signs*; Together with the *Cure* of al Diseases in the Body of Man. Being a Translation of the Works of that Learned and Renowned Doctor, *Lazarus Riverius*, now living; Councillor and Physician to the present King of *France*. Above fifteen thousand of the said Books in Latin have been sold in a very few Yeers, having been eight times printed, though al the former Impressions wanted the *Nature, Causes, Signs, and Differences* of the Diseases, and had only the Medicines for the cure for them; as plainly appears by the Authors Epistle.

2 *Riolanus* six Books of Anatomy and Physick, containing the Foundation of Physick and Chyrurgery; wherein all the Body of Man is in such sort Anatomically dissected, as that the Causes and Natures of al Diseases are demonstrated from the Fabrick and use of the Parts affected.

3 *Veslingus Anatomy of the Body of Man*, Wherein is exactly described, the several Parts of the Body of Man, illustrated with very many larger Brasse Plates than ever was in English before.

4 A Translation of the *New dispensatory*, made by the Colledg of Physicians of *London*. Whereunto is added *The Key to Galens Method of Physick*,

5 *The English Physician enlarged*. being an Astrologo-Physical Discourse of the vulgar Herbs of this Nation; wherein is shewed how to cure a mans self of most Diseases incident to Mans Body, with such things as grow in *England*, and for three pence charge. Also in the same Book is shewed, 1 The time of gathering al Herbs, both Vulgarly and Astrologically. 2 The way of drying, and keeping

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11 Health for the Rich and Poor, by Dyet without Physick.

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Grace. 3. Miscarriage of Duties. 4. Want of Assurance, 5. Affliction. 6 Temptation. 7. Dissertion. 8. Unserviceableness 9, Discourage ments from the Condition it self. Delivered in thirteen Sermons, on *Psalms 42. 11*.

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5 Sins of Infirmitie.

6 The false Apostle rried and discovered

7 The good and means of Establishment

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9 The great things Faith can suffer.

10 The Great Gospel Mystery of the Saints Comfort and Holiness, opened and applied from Christs Priestly Office.

11 Satans power to Tempt, and Christs Love to, and Care of his People under Temptation

12 Thankfulness required in every Condition.

13 Grace for Grace.

14 The Spiritual Actings of Faith through Natural Impossibilities.

15 Evangelical Repentance

16 The Spiritual Life, &c.

17 The Woman of Canaan.

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21 Grace and Love beyond Gifts

The Cause of our Divisions discovered, and the Cure propounded.

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that

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3 Gospel-worship, on Levit. 10. 3. Wherein is shewed, 1 The right manner of the Worship of God in General; And particularly, In hearing the Word, Receiving the Lords supper, & prayer.

4 Gospel-conversation, on Phil. 1. 17. Wherein is shewed, 1 That the Conversations of Beleevers must be above what could be by the Light of Nature. 2 Beyond those that lived under the Law. 3 And lutable to what Truths the Gospel holds forth. The which is added, The Misery of those Men that have their Portion in this Life only, on Psal. 17. 14.

5 A Treatise of Earthly-mindedness: Wherein is shewed, 1 What Earthly-mindedness is, 2. The great Evil thereof, on Phil. 3. part of the 19. verse. Also to the same Book is joyned, A Treatise of Heavenly-mindedness, and walking with God, on Gen. 5. 24. and on Phil. 3. 20.

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10 Precious Faith, on 2 Pet. 1. 1.

11 Of Hope, on 1 John 3. 3.

12 Of Walking by Faith, on 2 Cor. 5. 7.

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Kings and Governors be subject to the Laws of God, or the Laws of their Country. 4 How far the People are to obey their Governors. 5 Whether

all the People have, be their Governors. 6 Whether it be Lawful to depose an evil Governor. 7 What Confidence

is to be given to Princes.

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The Immortality of Mans Soul

The Anatomist Anatomized King Charls his Case, or an Appeal to al Rational men concerning his trial.

Mr. Owens stedfastness of the Promises.

A Vindication of Free Grace: Endeavoring to prove, 1. That we are not elected as holy, but that we should be holy; and that Election is not of kinds, but persons. 2. that Christ did not by his death intend to save all men, and touching those whom he intended to save, that he did not die for them only, if they would beleeve, but that they might beleeve. 3. that we are not justified properly by our beleeving in Christ, but by our Christ, beleeving in him. 4. that which differenceth one man from another, is not the improvement of a common ability restored through Christ to al men in general, but a principle of Grace wrought by the Spirit of God in the Elect. By John Parson.

Six Sermons preached by Doctor Hill. Viz.

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2 Truth and Love happily married in the Church of Christ.

3 The Spring of strengthening Grace in the Rock of Ages Christ Iesus.

4 The strength of the Saints to make Iesus Christ their strength.

5 The Best and Worst of Paul.

6 Gods Eternal preparation for his Dying Saints.

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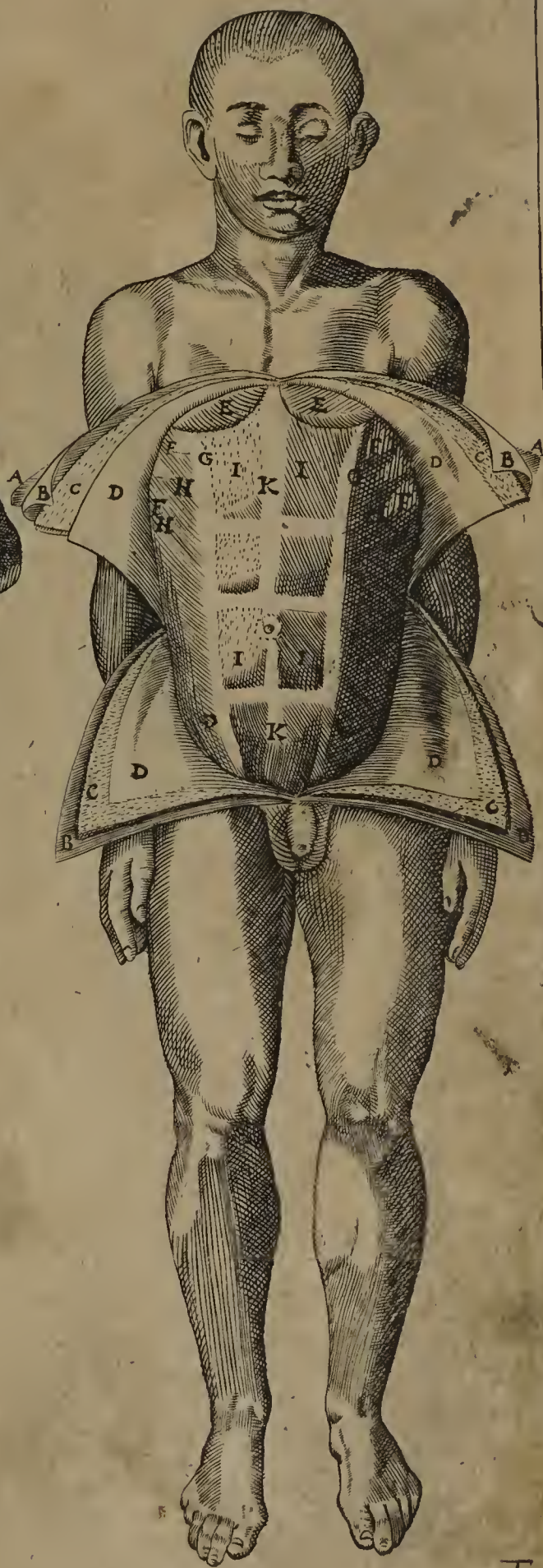
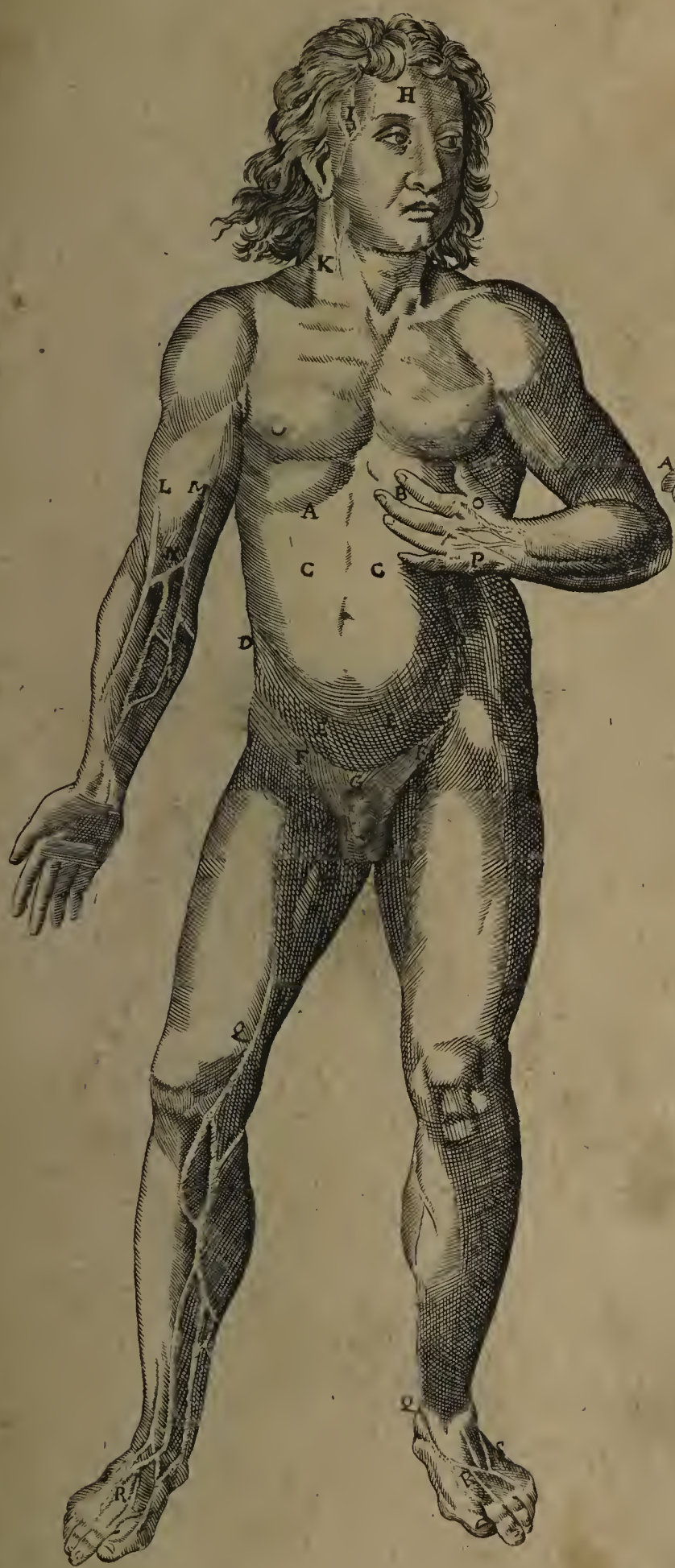
AN EXPLANATION OF THE TABLE OF
THE FIRST BRASSE PLATE
IN THIS BOOK.

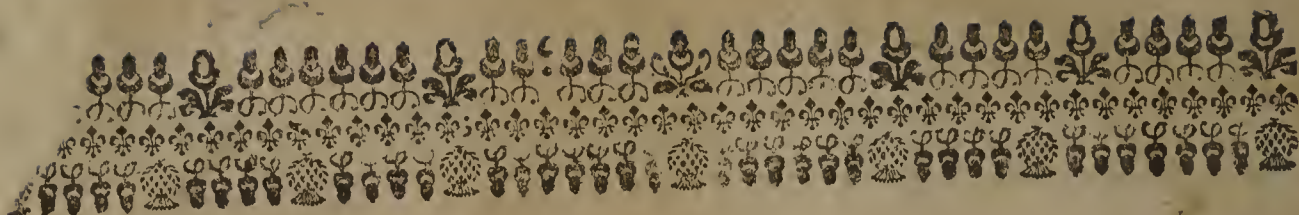
The first Figure shews the Effigies of a living Man, in which, not only the external parts of the *Abdomen*, but also the Veins under the Skin which are conspicuous are represented.

<i>A</i>	The right Hypochondria.	<i>M</i>	The basilick vein of the right Arm.
<i>B</i>	The left Hypochondria.	<i>N</i>	The middle or common Vein, which is not in the same place in all Bodies.
<i>CC</i>	The Epigastrium.	<i>O</i>	The cephalick vein of the left Hand.
<i>DD</i>	The Bowels.	<i>P</i>	The vein of the left Hand, called Salvatella.
<i>EE</i>	The Hypogastrium.	<i>Q Q</i>	The Vein Saphena descending.
<i>FF</i>	The Groyns.	<i>R R</i>	The Vein Saphena in the Foot it self.
<i>G</i>	The Region above the Privities.	<i>S S</i>	The Sciatick Vein.
<i>H</i>	The Vein of the Forehead.		
<i>I</i>	The Vein of the Temples.		
<i>K</i>	The external Jugular Vein.		
<i>L</i>	The cephalick vein of the right Arm.		

The Second Figure expresseth the common coverings of the Body of Man, and the Muscles under them laid open.

<i>AA</i>	The Scarf-skin.	<i>GG HH II</i>	The Muscles of the Abdomen obliquely descending.
<i>BBBB</i>	The Skin.	<i>G HH</i>	Their toothed beginnings.
<i>CCCC</i>	The Fat.	<i>IIII</i>	The tendon of the oblique descending Muscles, under which the right Muscles of the Abdomen with their Nervous inscriptions appear.
<i>DDDD</i>	The fleshy Membrane.	<i>KK</i>	The white line of the Abdomen.
<i>EE</i>	Part of the pectoral Muscles laid open.		
<i>FFF</i>	Certain beginnings of the Muscles called Serrati antici majores.		





THE TABLE OF THE SECOND BRASSE PLATE IN THIS BOOK, OPENED AND EXPLAINED.

This Table laies open the Bones of the *Abdomen* in seven Figures: two others, to wit, the eighth and ninth shews the Muscles of the *Abdomen*: The tenth gives you a cleer sight of the Parts, the *Peritonæum* being removed.

FIG. I.

Expresseth the five *Vertebræ* of the *Loyns*, as they are observed on the fore part.

a a a a The *Transverse Proceß*.

FIG. II.

Laies open to your view, the *Vertebræ* of the *Loyns*, as are presented on the back Part.

a The hole for the *Marrow* of the *Back*.

b b The *transverse Proceß*.

c c c c The *oblique Proceß*.

d The *acute Proceß*.

FIG. III.

Represents the internal face of the *Os Coxæ*, as it is united in such as are grown up.

A *Os Ilium*.

B B *Os Coxendix*.

C *Os Pubis*.

FIG. IV.

Demonstrates the external face of the *Os Coxæ*.

A *Os Ilium*.

a a The *Spine* of the *Os Ilium*.

B *Os Coxendix*.

C C *Os Pubis*.

FIG. V.

Gives the internal view of the *Os Sacrum* divided into six parts.

a a a a The holes which give passage to the *Nerves*.

b The three parts of the *Coccyx*.

FIG. VI.

The same Bone externally to be seen.

a The hole for the *Marrow* of the *Back*.

b b b Lesser holes for *Nerves*.

c *Os Coccyx*.

FIG. VII.

The Figure which decipheres the *Os Coxæ*, as it is observed to be distinct in Children.

A *Os Ilium* a little taken from the rest.

B B *Os Coxendix*.

C C *Os Pubis*.

a a The cleft distinguishing the *Os Coxendix* and *Os Pubis*.

The connexion of all the Bones of the *Abdomen*, see in the Table to Chapter 17.

FIG. VIII.

A The Muscle of the *Abdomen* obliquely descending, in which

a a Are the toothed beginnings.

b b The Tendon sticking to the white Line.

B The Muscle of the *Abdomen* obliquely ascending, in which

c c c Its beginning.

d d A portion of its tendon which covers the right Muscle.

e e The right Muscle of the *Abdomen*.

FIG. IX.

A The transverse Muscle loosed about the beginning, in which

a a a The beginning.

b b A portion of the Tendon.

B The right Muscle of the *Abdomen*, in which

c The Beginning.

d d d The *Nervous inscriptions*.

e The end.

C The back part of the other right Muscle, in which

d Shews the *Vein* and *mammary Artery* descending.

e The *Epigastrick vein* and *artery* ascending.

f The *Anastomosis* of the *veins*.

g g The *Peritonæum* laid bare from the muscles.

D D The *Pyramidal Muscles*.

E E The *Proceß* of the *Peritonæum* descending to the *Cods*.

FIG. X.

A Part of the *Pectoral Muscle* detached.

B The *Sternum*.

C The *Stomach* being something hid by the *Liver*.

D The *Liver*.

E The *Omentum* in its Situation.

b A portion which sticketh to the *Liver*.

c c A portion which is knit to the bottom of the *Stomach*.

d d d The remainder of the *Omentum* as it lies upon the *Bowels*.

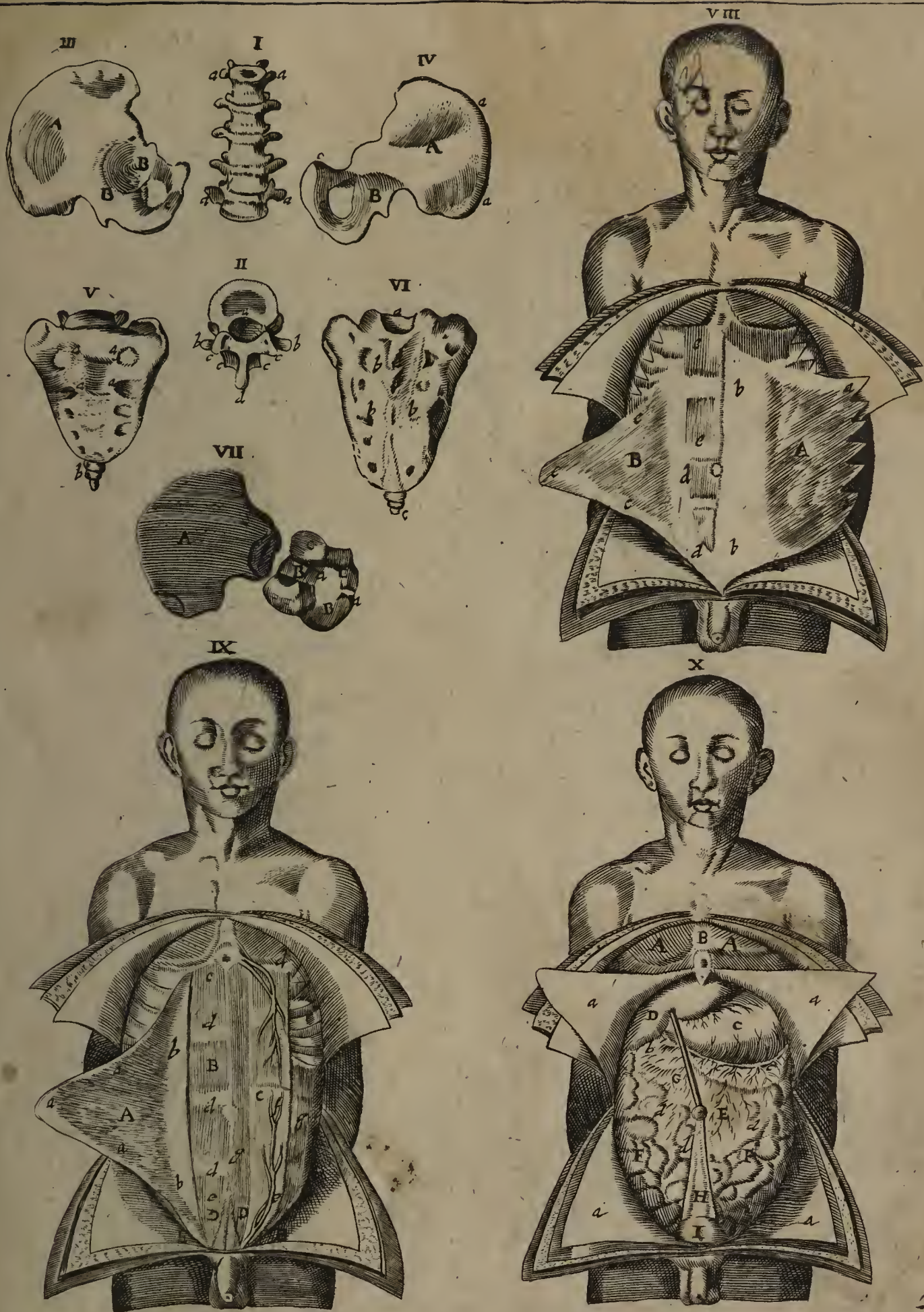
F F The *Bowels* in their situation.

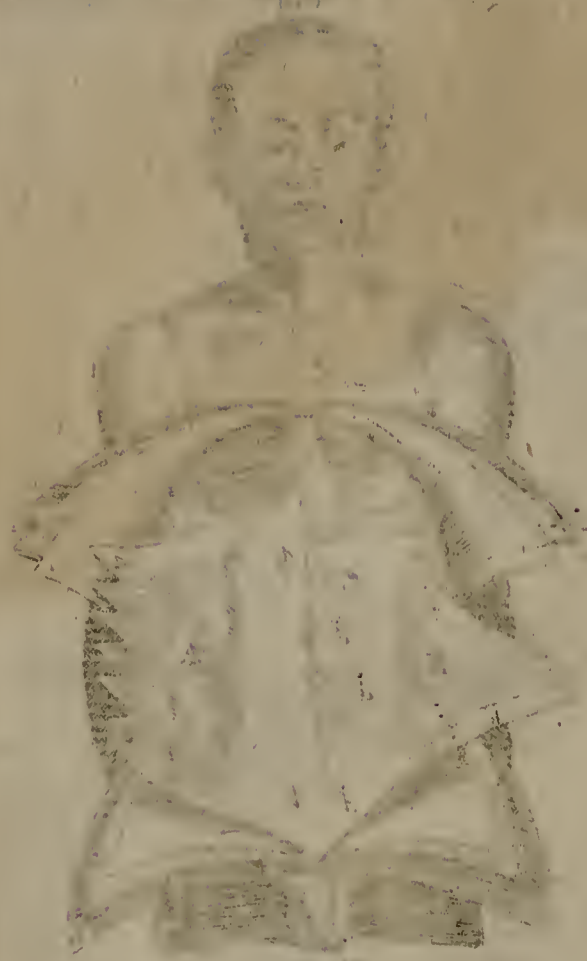
G The *Navil Vein*.

H The *Ligament* of the *Bladder* composed of the *Urachos*, and the two *Navil arteries*.

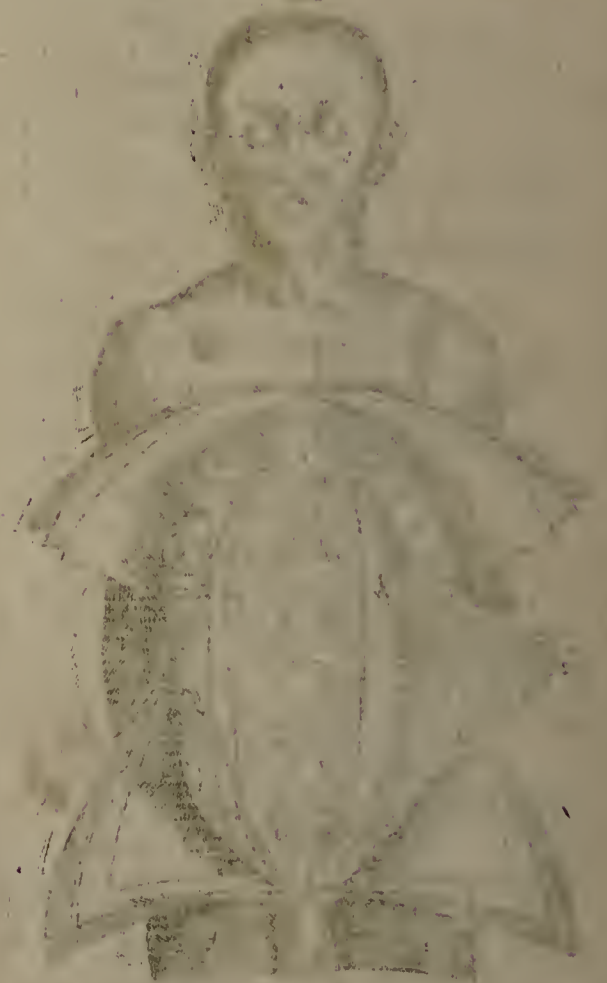
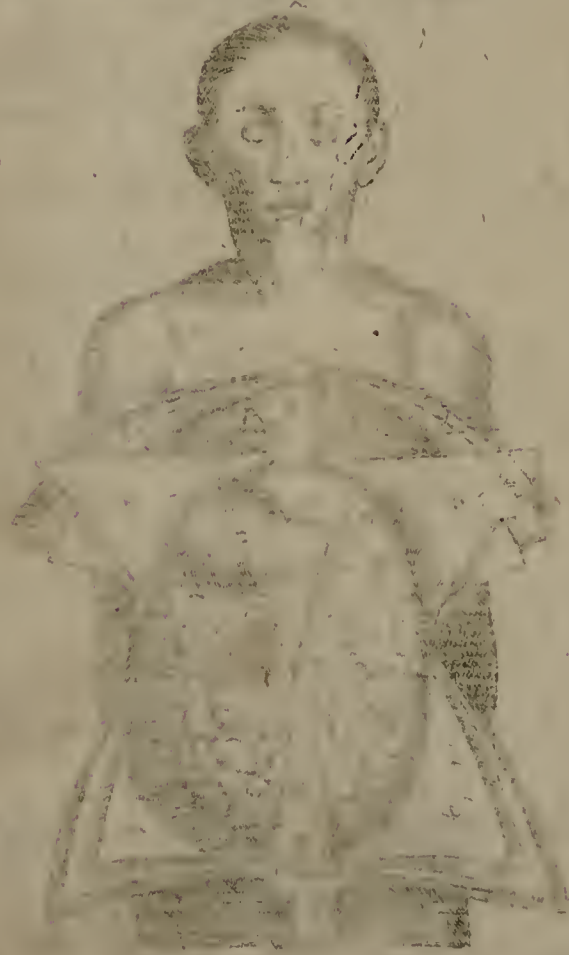
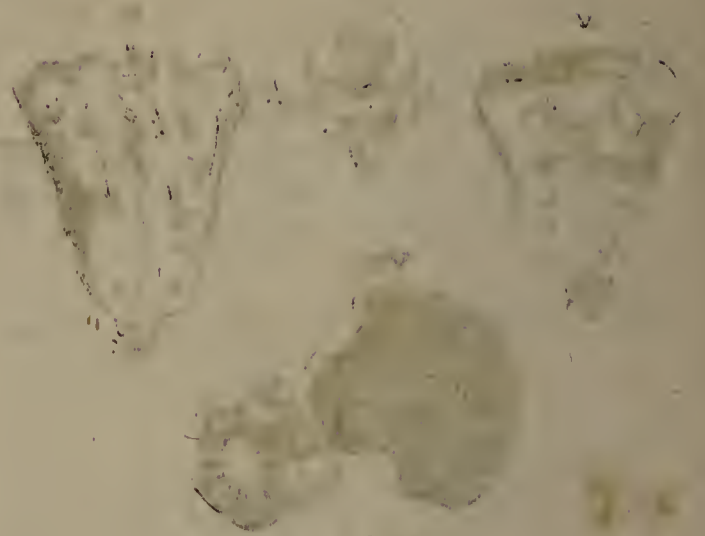
I The bottom of the *Bladder*.

a a a a The *Peritonæum* divided.





Chinese characters in a decorative frame.



AN EXPLANATION OF THE TABLE
OF THE LAND REVENUE
OF THE DISTRICT OF

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853	854	855	856	857	858
859	860	861	862	863	864
865	866	867	868	869	870
871	872	873	874	875	876
877	878	879	880	881	882
883	884	885	886	887	888
889	890	891	892	893	894
895	896	897	898	899	900
901	902	903	904	905	906
907	908	909	910	911	912
913	914	915	916	917	918
919	920	921	922	923	924
925	926	927	928	929	930
931	932	933	934	935	936
937	938	939	940	941	942
943	944	945	946	947	948
949	950	951	952	953	954
955	956	957	958	959	960
961	962	963	964	965	966
967	968	969	970	971	972
973	974	975	976	977	978
979	980	981	982	983	984
985	986	987	988	989	990
991	992	993	994	995	996
997	998	999	1000	1001	1002

AN EXPLICATION OF THE TABLE OF THE THIRD BRASSE PLATE IN THIS BOOK.

The Omentum and Mesenterium, figure I. The Gula with its Muscles, figure II. and III. The Stomach and Bowels under it, figure IV. The Tunicles of the Bowels, figure V. and VI. The Muscles of the right Gut, figure VII. The Nerve of the sixth pair, figure VIII.

FIG. I.

- AAAA. The Mesenterium with the Guts adjoyned.
 aaaa. The Glandulæ of the Mesenterium.
 BBB. The Vessels of the Mesenterium diffused to the Guts.
 CC. Part of the Colon stretched out.
 DD. Part of the Omentum drawn abroad upwards.

FIG. II.

- AA. The first pair of the Muscles of the Gula, called Cephalopharyngæus.
 BB. The second pair of the Muscles of the Gula, or Sphenopharyngæus.
 CC. The third pair, Stylopharyngæus.
 DD. The Sphincter of the Throat.
 EEE. A backward view of the Gula.
 F. The left external Nerve of the sixth pair.
 G. The right external Nerve of the sixth pair.
 H. The superior Orifice of the Stomach.
 III. The bottom of the Stomach.
 K. The inferior Orifice of the Stomach with a portion of the Duodenum annexed to it.

FIG. III.

- AA. The Muscles Cephalopharyngæus conspicuous on the fore part.
 BB. The Muscles Sphenopharyngæus.
 CC. The Muscles Stylopharyngæus.
 DD. The Sphincter of the throat dilated.
 E. The internal face of the Gula.
 F. The descending part of the Gula.

FIG. IV.

- A. The superior Orifice of the Stomach knit together within a thread.
 B. The inferior Orifice, or Pylorus.
 CC. The common tunicle of the Stomach separated.
 D. The middle tunicle of the Stomach.
 E. The inner tunicle of the Stomach.
 F. A portion of the Duodenum.
 GG. The gut called Jejunum.
 HHH. The gut Ileum as it lies in its foldings.
 I. The Gut Cæcum.
 KKK. The Gut Colon.
 L. The Gut, being opened in the beginning of the Colon.
 M. The beginning of the right Gut, knit with a thread.

FIG. V.

- PP. The common tunicle of the guts separated.
 Q. The middle tunicle of the Guts, which is the first proper one.

FIG. VI.

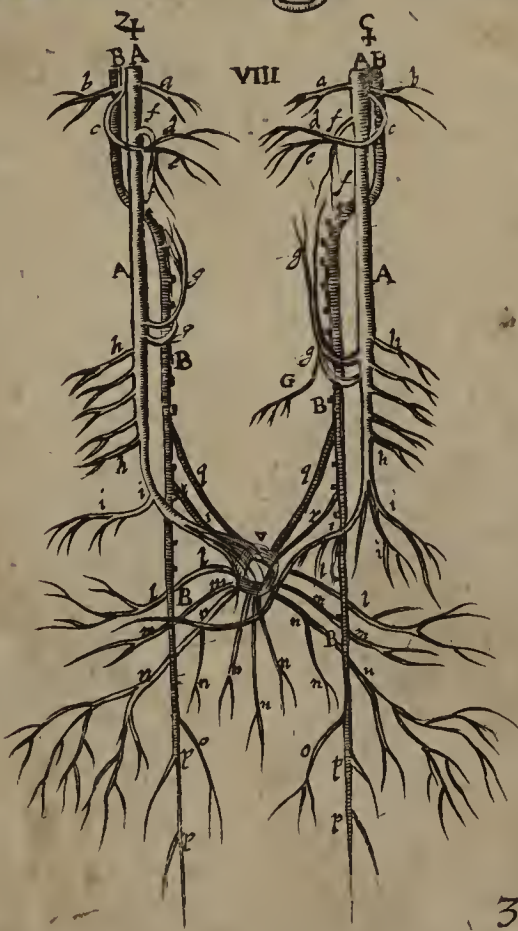
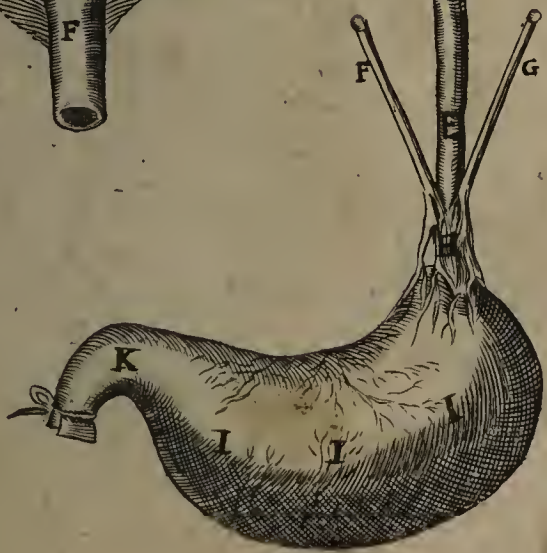
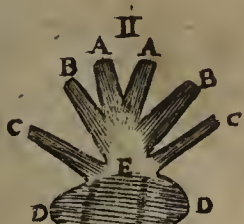
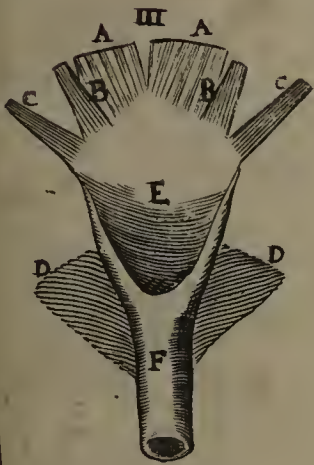
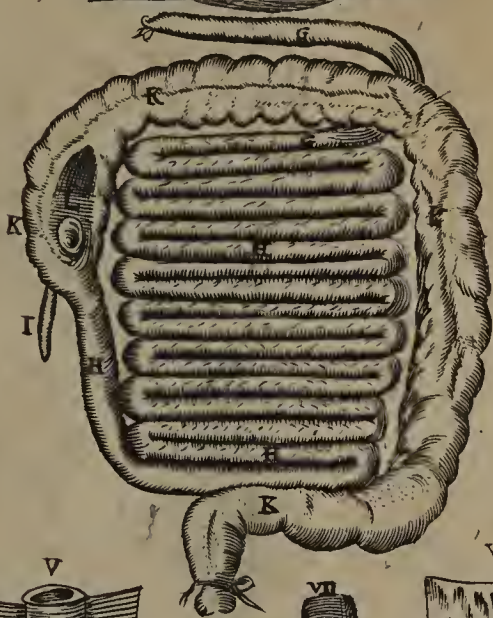
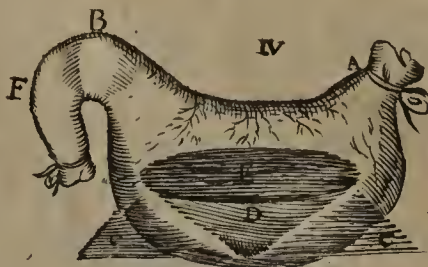
- R. The rigged tunicle of the Guts which is the second proper.

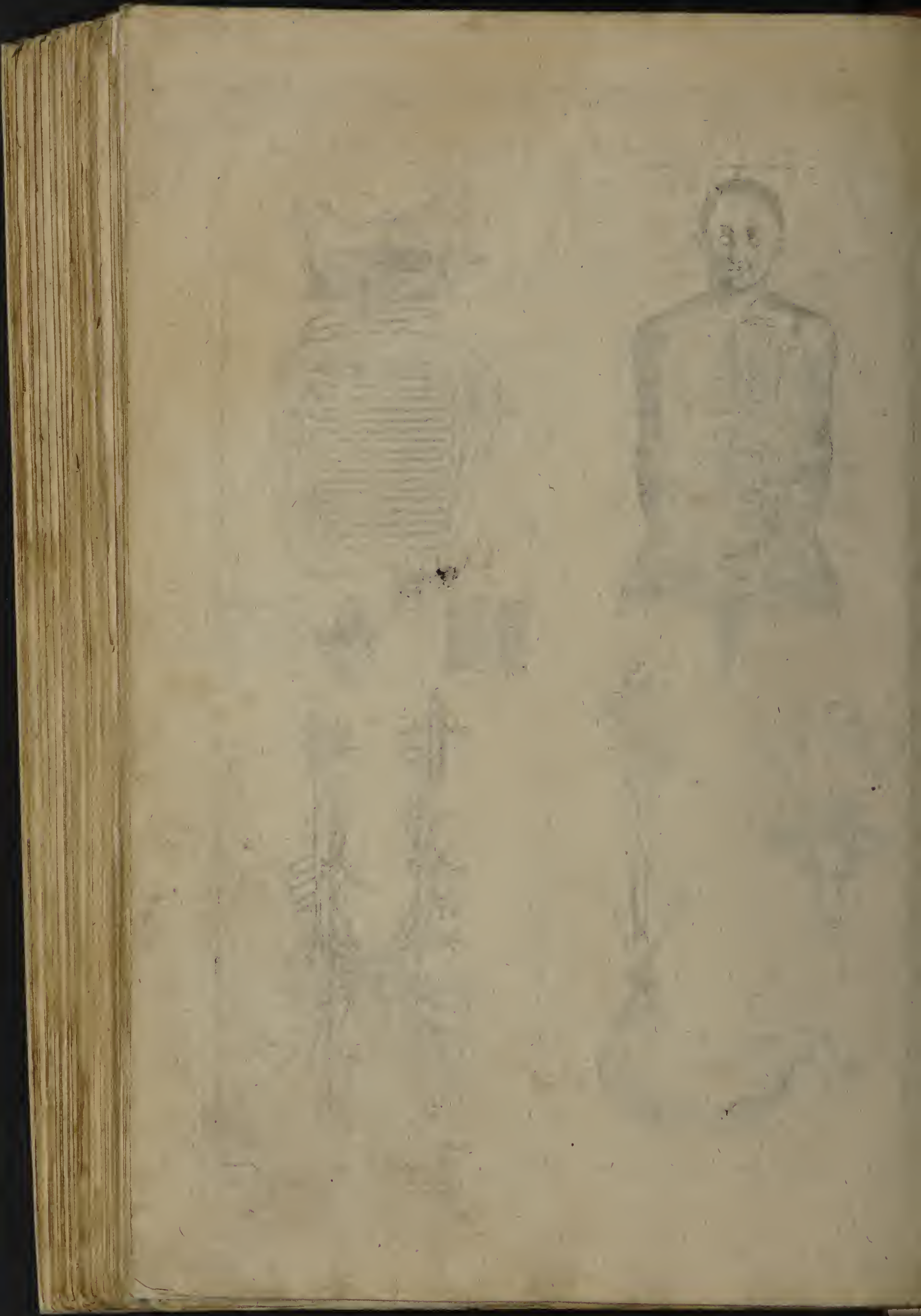
FIG. VII.

- M. The right Gut cut off.
 NN. The two muscles called Levatores.
 O. The Sphincter of the Fundament.

FIG. VIII.

- U. The Nerve of the sixth pair on the right side, in which
 AA. The external and greater Branch.
 a. The branch which is carried to the Neck.
 b. A branch of the seventh pair, joyned to this sixth pair which is carried to the Neck.
 c. A Nerve of the seventh pair joyned to the sixth under the skull.
 d. A branch of the seventh passing to the muscle of the Os Hyois.
 e. A branch from the seventh to the tongue.
 ff. A Nerve from the external branch of the sixth pair, which is carried to the internal muscles of the Larynx.
 gg. The right Nerve called Recurrens.
 hh. Many Nerves distributed to the Lungues and windpipe.
 iii. The branches of the right Stomachical, stretched out.
 BBB. The internal, or costal branch, laid open with its bunches.
 V. The Nervous plexure of the Mesenterium guarded with certain callous Bodies.
 ll. The branch which is carried to the Omentum, Duodenum, and Liver.
 mm. The branch which is carried to the right Kidney.
 nnnn. The branches distributed in the Mesenterium and Guts.
 o. The branch which goes to the Os Sacrum.
 pp. The extremity of the internal right branch which is distributed to the Tomb and under.
 qr. The branches from the internal right branch which make the plexure on that side.
 s. The Nerve of the sixth pair on the left side, in which, the signification of the same, save only
 G. Is the Nerve from the left Recurrens, which is distributed to the Pericardium, and it self.
 **. The Nerve which from the external left branch of the stomachical is carried to the Liver.
 ll. The Nerve which is carried to the Splen and Gut Colon.
 mm. The Nerve of the left Kidney. The remainder are the same with the former.





THE HISTORY OF THE EAST
INDIA COMPANY

By JOHN HARRISON
Esq. of the Inner Temple

1	1600	The first voyage of the East India Company to the East Indies, in the ship <i>Golden Hinde</i> , commanded by James Lancaster.
2	1601	The second voyage of the East India Company to the East Indies, in the ship <i>Golden Hinde</i> , commanded by James Lancaster.
3	1602	The third voyage of the East India Company to the East Indies, in the ship <i>Golden Hinde</i> , commanded by James Lancaster.
4	1603	The fourth voyage of the East India Company to the East Indies, in the ship <i>Golden Hinde</i> , commanded by James Lancaster.
5	1604	The fifth voyage of the East India Company to the East Indies, in the ship <i>Golden Hinde</i> , commanded by James Lancaster.
6	1605	The sixth voyage of the East India Company to the East Indies, in the ship <i>Golden Hinde</i> , commanded by James Lancaster.
7	1606	The seventh voyage of the East India Company to the East Indies, in the ship <i>Golden Hinde</i> , commanded by James Lancaster.
8	1607	The eighth voyage of the East India Company to the East Indies, in the ship <i>Golden Hinde</i> , commanded by James Lancaster.
9	1608	The ninth voyage of the East India Company to the East Indies, in the ship <i>Golden Hinde</i> , commanded by James Lancaster.
10	1609	The tenth voyage of the East India Company to the East Indies, in the ship <i>Golden Hinde</i> , commanded by James Lancaster.
11	1610	The eleventh voyage of the East India Company to the East Indies, in the ship <i>Golden Hinde</i> , commanded by James Lancaster.
12	1611	The twelfth voyage of the East India Company to the East Indies, in the ship <i>Golden Hinde</i> , commanded by James Lancaster.
13	1612	The thirteenth voyage of the East India Company to the East Indies, in the ship <i>Golden Hinde</i> , commanded by James Lancaster.
14	1613	The fourteenth voyage of the East India Company to the East Indies, in the ship <i>Golden Hinde</i> , commanded by James Lancaster.
15	1614	The fifteenth voyage of the East India Company to the East Indies, in the ship <i>Golden Hinde</i> , commanded by James Lancaster.
16	1615	The sixteenth voyage of the East India Company to the East Indies, in the ship <i>Golden Hinde</i> , commanded by James Lancaster.
17	1616	The seventeenth voyage of the East India Company to the East Indies, in the ship <i>Golden Hinde</i> , commanded by James Lancaster.
18	1617	The eighteenth voyage of the East India Company to the East Indies, in the ship <i>Golden Hinde</i> , commanded by James Lancaster.
19	1618	The nineteenth voyage of the East India Company to the East Indies, in the ship <i>Golden Hinde</i> , commanded by James Lancaster.
20	1619	The twentieth voyage of the East India Company to the East Indies, in the ship <i>Golden Hinde</i> , commanded by James Lancaster.
21	1620	The twenty-first voyage of the East India Company to the East Indies, in the ship <i>Golden Hinde</i> , commanded by James Lancaster.
22	1621	The twenty-second voyage of the East India Company to the East Indies, in the ship <i>Golden Hinde</i> , commanded by James Lancaster.
23	1622	The twenty-third voyage of the East India Company to the East Indies, in the ship <i>Golden Hinde</i> , commanded by James Lancaster.
24	1623	The twenty-fourth voyage of the East India Company to the East Indies, in the ship <i>Golden Hinde</i> , commanded by James Lancaster.
25	1624	The twenty-fifth voyage of the East India Company to the East Indies, in the ship <i>Golden Hinde</i> , commanded by James Lancaster.
26	1625	The twenty-sixth voyage of the East India Company to the East Indies, in the ship <i>Golden Hinde</i> , commanded by James Lancaster.
27	1626	The twenty-seventh voyage of the East India Company to the East Indies, in the ship <i>Golden Hinde</i> , commanded by James Lancaster.
28	1627	The twenty-eighth voyage of the East India Company to the East Indies, in the ship <i>Golden Hinde</i> , commanded by James Lancaster.
29	1628	The twenty-ninth voyage of the East India Company to the East Indies, in the ship <i>Golden Hinde</i> , commanded by James Lancaster.
30	1629	The thirtieth voyage of the East India Company to the East Indies, in the ship <i>Golden Hinde</i> , commanded by James Lancaster.

AN UNFOLDING OF THE TABLE OF
THE FOURTH BRASSE
PLATE IN THIS BOOK.

The fourth Table laies down the Scituation of the Sweet-bread, Liver,
and Spleen, and the Delineation of the *Vena Porta*.

FIG. I.

- A* The hollow part of the Liver.
B The round convex, or bowing part of the Liver.
e The Umbilicar Vein drawn upwards.
C The Gall in its Scituation.
D The Spleen in its natural place.
EE The Sweet-bread in its proper place.
FF The Vena Porta descending by the Sweet-bread under the Liver.
G The superior Mesenterical Artery.
aaaa The branches of the Vena Porta, extended by the Mesenterium.
bbbb The branches of the artery distributed by the Mesenterium.
HH The Mesenterium it self dismantled of its superior Membrane.
II The Splenical Vessels laid open, the Pancreas being cut.

FIG. II.

- AA* The Body of the Sweet-bread deciphored in its Natural form.

FIG. III.

The back part of the Sweet-bread, together with the Spleen turned downwards.

- AA* The substance of the Sweet-bread, its Membrane being taken off.
BBB The channel of the Sweet-bread newly found out.
C The biliar pore joyned to the channel.
DDD A portion of the Guts Duodenum and Jejunum, cut off.
E The common Orifice, by which the biliar pore and channel of the Sweet-bread, open themselves into the Duodenum.
FFF The internal face of the Spleen.
GGG The veins and arteries distributed in the Spleen.

FIG. IV.

- AA* The convex or bowing part of the Liver.
B The skin of the Liver separated from it.
CC The Ligament of the Liver called Septale.
DD The large branches of the Vena Cava within the Liver.

FIG. V.

- AA* The hollow part of the Liver turned upwards.
B The Lobe of the Liver by which it joyns it self to the Omentum.

- G* The cleft of the Liver, out of which the Umbilicar vein descends.
E The Umbilicar vein turned upwards.
F The Gall placed under the Liver.
G The channel of the Gall.
HH The biliar pore, with the channel stretched outwards, together with a part of the Duodenum, noted by *M*.
I The trunk of the Vena Porta descending from the Liver.
K The right Celiacal artery.
L A Nerve arising from the plexure of the costals.

FIG. VI.

The Vena Porta whol, distinguished into branches, as it is publicly shewed.

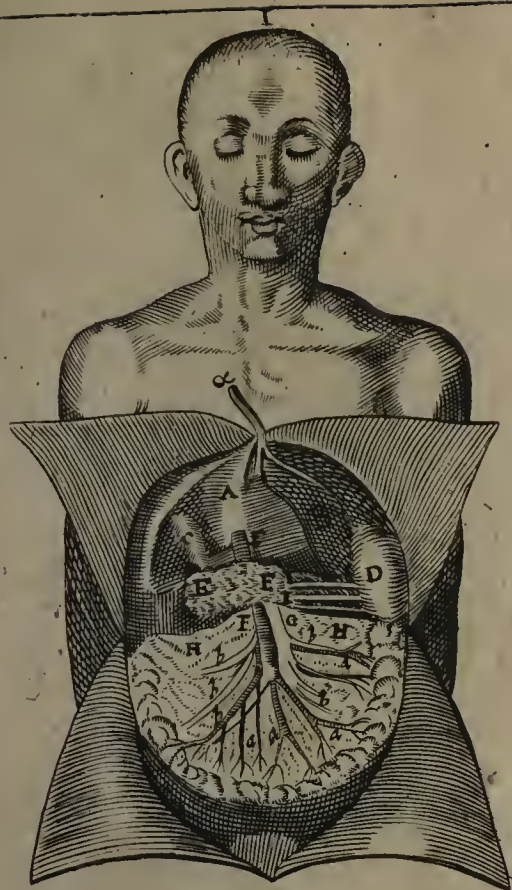
- AAA* The trunk of the Vena Porta; *A* the inferior portion, descending from the Liver. *AA* the deduction of it to the right and left with an infinite number of smal branches.
B The Splenical branch, divided first into great, afterwards into very many smal branches, and distributed like strings about the Spleen.
C The right Mesenterical branch.
D The left Mesenterical branch.
aa The Umbilicar vein,
b The vein of the Gall.
c The vein of the Sweet-bread.
dd The vein called Gastrica dextra.
eee The greater Gastrica sinistra.
fg The lesser veins called Gastricæ sinistrae.
h The vein called Vas breve.
ii The vein called Gastroepiploica sinistra.
KK The vein called Gastroepiploica dextra.
ll The Hemorrhoidal veins produced here from the right Mesenterical branch of the Vena Porta.
m The vein of the Duodenum.

FIG. VII.

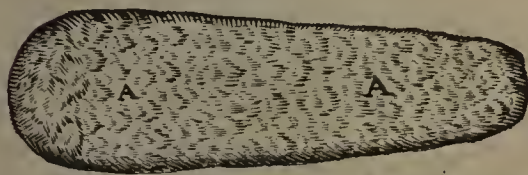
- A* The convex part of the Spleen laid open.
BB The Membrane of the Spleen separated.
CC The black substance of the Spleen.

FIG. VIII.

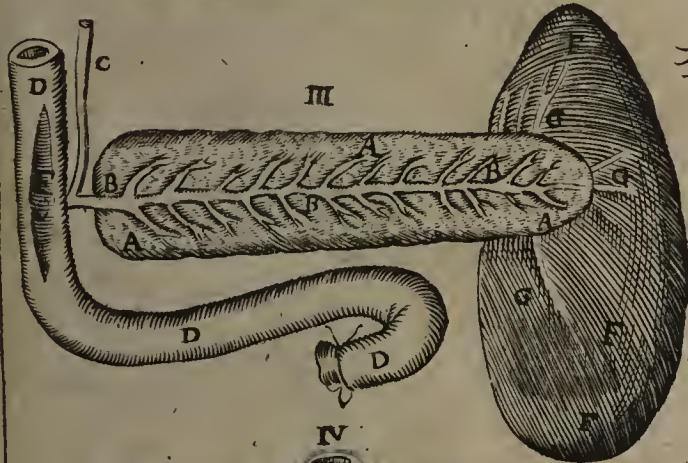
- AAA* The hollow part of the Spleen which receives the Vessels.
B The Splenical vein with its three branches.
C The Splenical artery divided in like manner before it enter the Spleen.



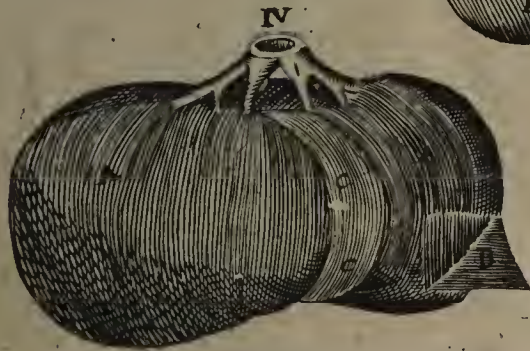
II



III



IV



V

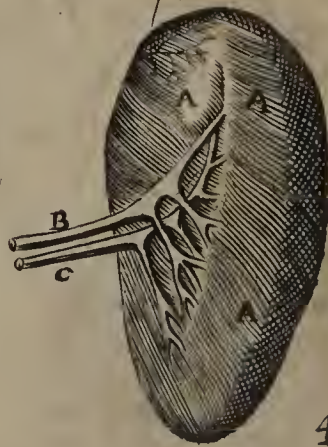


VI

VII



VIII



4



1840
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1869



AN EXPLANATION OF THE TABLE OF THE FIFT BRASSE PLATE IN THIS BOOK.

The present Table laies open the Reins with their *Glandula*, the Emulgent Vessels, Bladder and *Ureters*. Also the rise and progress of the Spermatick Vessels.

FIG. I.

- AA The *Glandula* of the Reins, or the Capsula of Melancholly.
- B The right Kidney uncovered of the Membrane.
- C The left Kidney.
- D The descending trunk of the Vena Cava.
- E The descending trunk of the great artery.
- FF The right Ureter.
- GG The left Ureter.
- HH The right Vessels preparing the Seed.
- II The left Vessels preparing the Seed.
- K Part of the Bladder, besides which, the Vessels carrying the Seed are turned in the Abdomen.
- L Part of the right Gut cut off.

FIG. II.

- AA The common Membrane of the Reins which is bespread with fat.
- BB The *Glandula* of the Kidneys.
- C The right Kidney.
- D The left Kidney.
- E The proper skin of the Kidneys partly separated.
- F The trunk of the Vena Cava descending.
- G The trunk of the great artery descending.
- H The left Emulgent Vein.
- II The right Emulgent Vein.
- aa The right Emulgent arteries.
- bb The left Emulgent arteries.
- c The left Spermatick artery.
- d The left Spermatick Vein.
- e The right Spermatick Vein.
- f The right Spermatick artery.
- g The Fatty Vein arising from the Emulgent.
- h The fatty artery.
- KKKK The *Ureters* on both sides.

- LLL The Vessels preparing the Seed.
- MM The Scrotum with the testicles in it.
- NN The Vessels carrying the Seed.
- O The Bladder stripped of his external tunicle.

FIG. III.

- A The Capsula, or right *Glandula Renalis*.
- BB A Vein from the trunk of the Vena Cava coming into it.

FIG. IV.

- A The Capsula dissected.
- BB The hollownes of the Capsula somewhat laid open.

FIG. V.

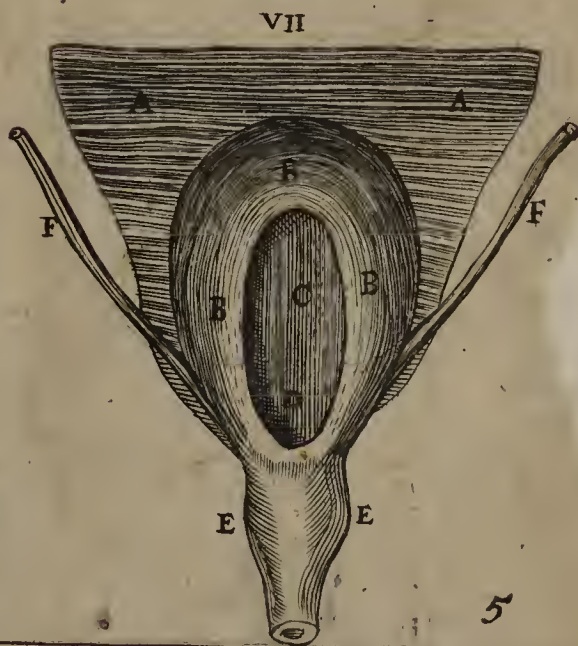
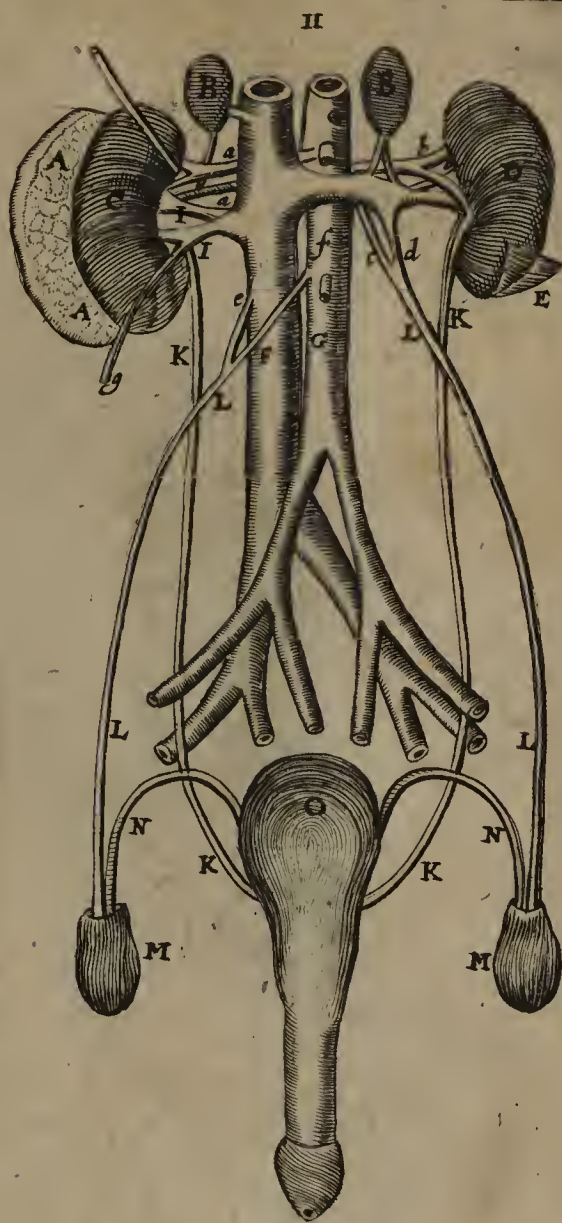
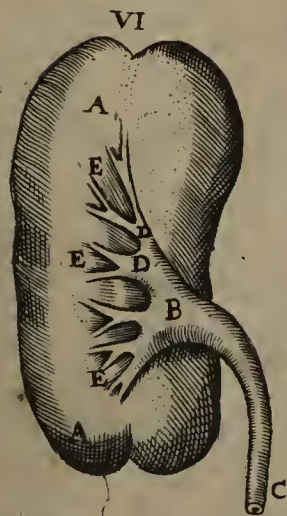
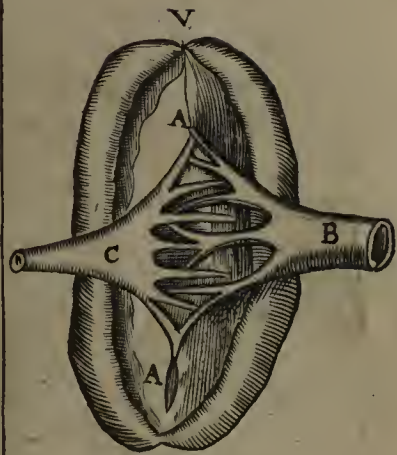
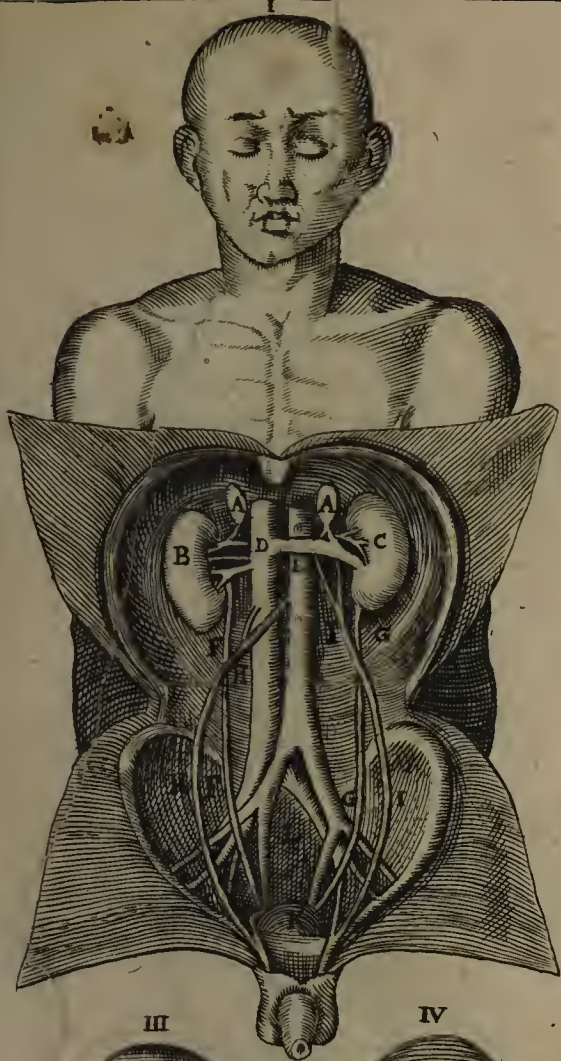
- AA The internal face of the dissected Kidney.
- BB The Emulgent Vein with his branches distributed in the Kidney.
- C The Emulgent artery in like manner distributed.

FIG. VI.

- AA The Kidney dissected.
- B The Sinus of the Ureter about the Kidney.
- C The round form of the *ureters* descending from the Kidneys.
- DD The narrow passages of the *ureters*.
- EEE The fleshy Knobs called Papillares.

FIG. VII.

- AA The common tunicle of the Bladder drawn back.
- BB The middle tunicle and bottom of the Bladder.
- C The inner tunicle which appears when the Bladder is cut.
- D The Orifice of the bladder by which the urine passeth out.
- EE The Neck of the Bladder which seems swelled by reason of the Prostatæ joined to it.
- FF Part of the *ureters* that come to the Bladder.





THE STATE OF NEW YORK

IN SENATE

January 1st 1882

NAME	RESIDENCE	EDUCATION	RELIGION	POLITICAL	PROFESSION	INDUSTRY	CHARACTER	REMARKS
John A. B. Smith	New York	Yale	Episcopal	Rep.	Lawyer	Banker	Steadfast	
James H. Jones	New York	Harvard	Presbyterian	Dem.	Physician	Teacher	Modest	
William C. Brown	New York	Columbia	Methodist	Rep.	Engineer	Merchant	Energetic	
Charles D. White	New York	Yale	Episcopal	Dem.	Physician	Teacher	Steadfast	
Edward F. Green	New York	Harvard	Presbyterian	Rep.	Lawyer	Banker	Steadfast	
Robert L. Black	New York	Columbia	Methodist	Dem.	Physician	Teacher	Modest	
Thomas M. Gray	New York	Yale	Episcopal	Rep.	Engineer	Merchant	Energetic	
Henry N. Hall	New York	Harvard	Presbyterian	Dem.	Physician	Teacher	Steadfast	
Frederick O. King	New York	Columbia	Methodist	Rep.	Lawyer	Banker	Steadfast	
George P. Lee	New York	Yale	Episcopal	Dem.	Physician	Teacher	Modest	
Alfred Q. Miller	New York	Harvard	Presbyterian	Rep.	Engineer	Merchant	Energetic	
Charles R. Nelson	New York	Columbia	Methodist	Dem.	Physician	Teacher	Steadfast	
William S. Phillips	New York	Yale	Episcopal	Rep.	Lawyer	Banker	Steadfast	
John T. Reed	New York	Harvard	Presbyterian	Dem.	Physician	Teacher	Modest	
Edward U. Scott	New York	Columbia	Methodist	Rep.	Engineer	Merchant	Energetic	
Frederick V. Taylor	New York	Yale	Episcopal	Dem.	Physician	Teacher	Steadfast	
George W. Young	New York	Harvard	Presbyterian	Rep.	Lawyer	Banker	Steadfast	

AN EXPLICATION OF THE TABLE OF THE SIXT BRASSE PLATE IN THIS BOOK.

This Table shews the Spermatick Vessels, the Testicles, the Membranes of the
Scrotum, the Yard, the Reins and Bladder.

FIG. I.

A	The right Glandula renalis.
B	The left Glandula renalis.
CC	The Reins on each side.
D	The left emulgent Vein.
E	The right emulgent Vein.
FF	The right and left emulgent Arteries.
G	The right Spermatical Vein.
HH	The trunk of the Vena Cava descending.
I	The left Iliack branch of the Vena Cava.
K	The right Iliack branch.
L	The right Spermatical Artery.
MM	The trunk of the great artery descending.
N	The right Iliack branch of the great Artery.
O	The left Iliack branch of the same.
P	The left Spermatical artery.
Q	The left Spermatical vein.
RR	The left Ureter.
SS	The right Ureter.
TT	The Vessels preparing the Seed.
tt	The same Vessels, in what place the Pampini- formia begin.
VV	The Vasa deferentia passing behind the Blad- der.
XX	The Scrotum with the Testicles in it.
Y	The Bladder.
Z	The neck of the Bladder.
aa	The two Muscles erecting the Yard.
bb	The two Muscles dilating the Urethra.
c	The Body of the Yard.
d	The Præputium.

FIG. II.

AA	The skin of the Scrotum separated.
BBB	The Membrane called Dartus.
CC	The external part of the membrane Elytroides.
DD	The Cremaster arising under the transverse Muscles of the Abdomen.
EE	The internal or membranous part of the Ely- troides.
FF	The proper white tunicle of the testicle sepa- rated.
f	The same joyned to the testicle.
G	The Glandulous substance of the testicle.
H	The Vessel called Pampiniforme or Pyrami- dale.

II	Epididymis.
K	The Parastate.

FIG. III.

α	A portion for the preparing Vessels.
AA	The Pyramidal Vessels.
BB	Epididymis.
CCC	Parastates.
D	The testicle covered with its proper Membrane
E	A portion of the Vasa deferentia.

FIG. IV.

AA	The contexture of the veins and arteries in the Pyramidal Vessel.
BB	Epydidymis.
CC	Parastate.
DD	A portion of the Vasa deferentia.

FIG. V.

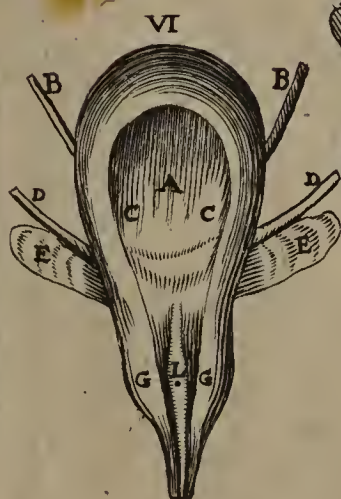
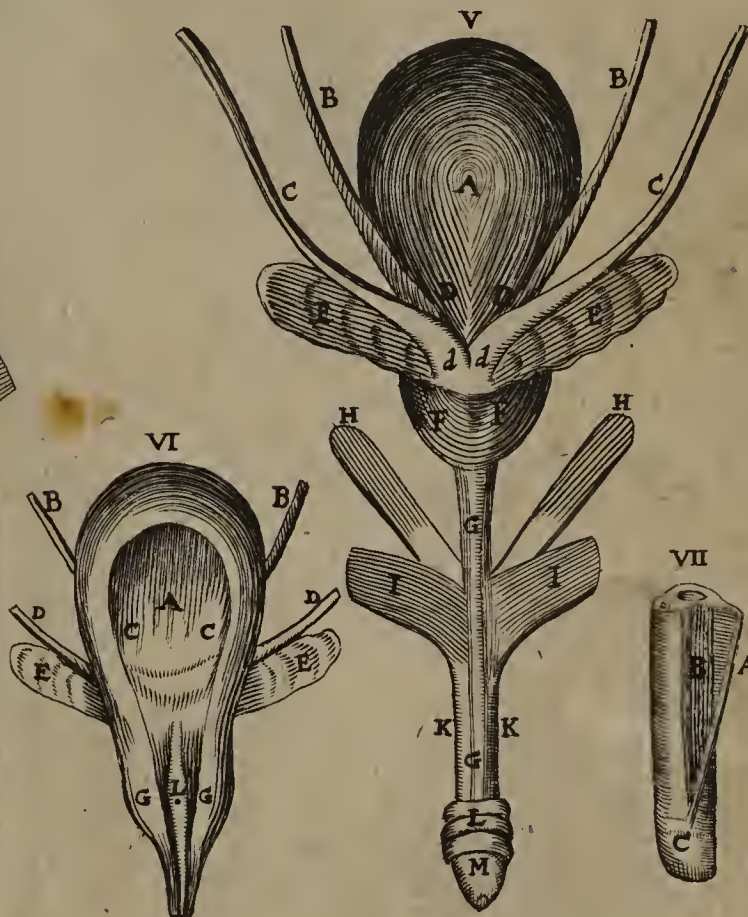
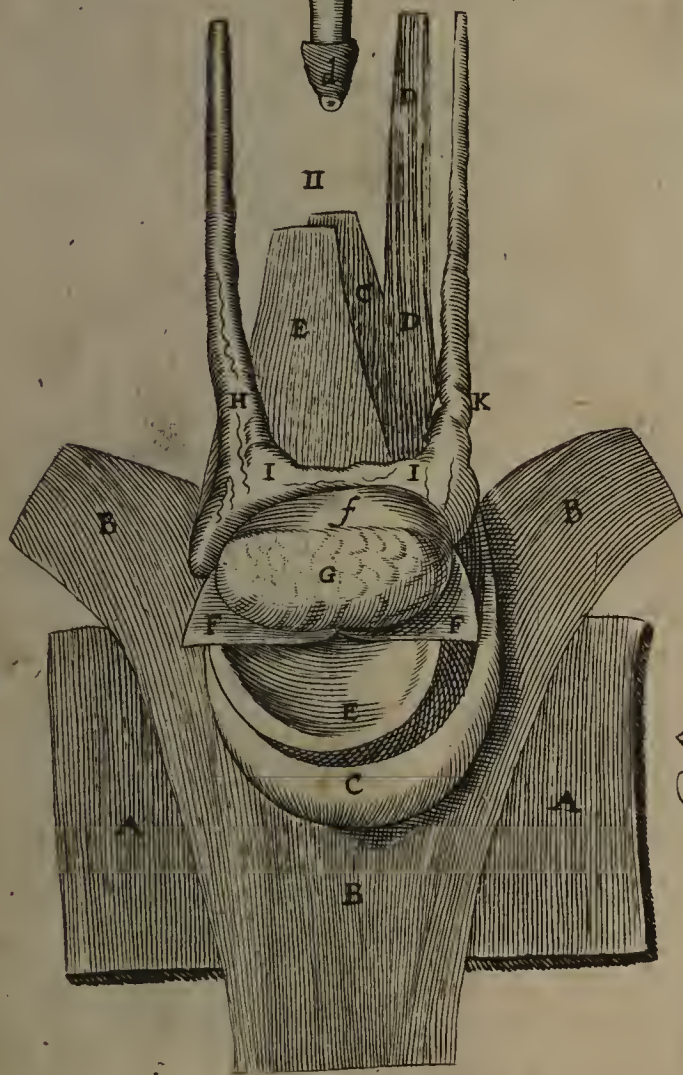
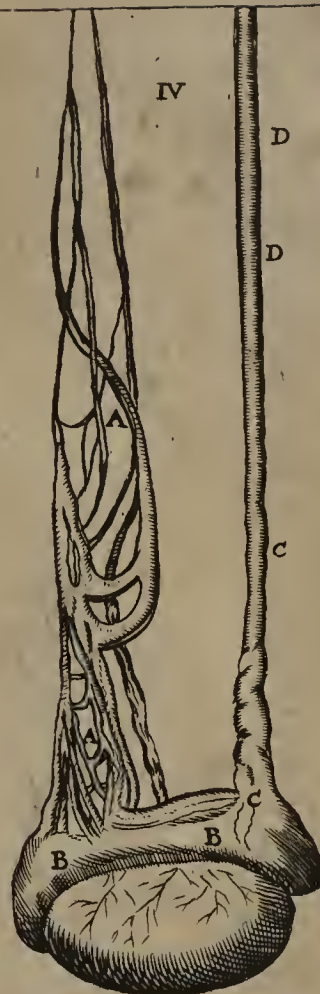
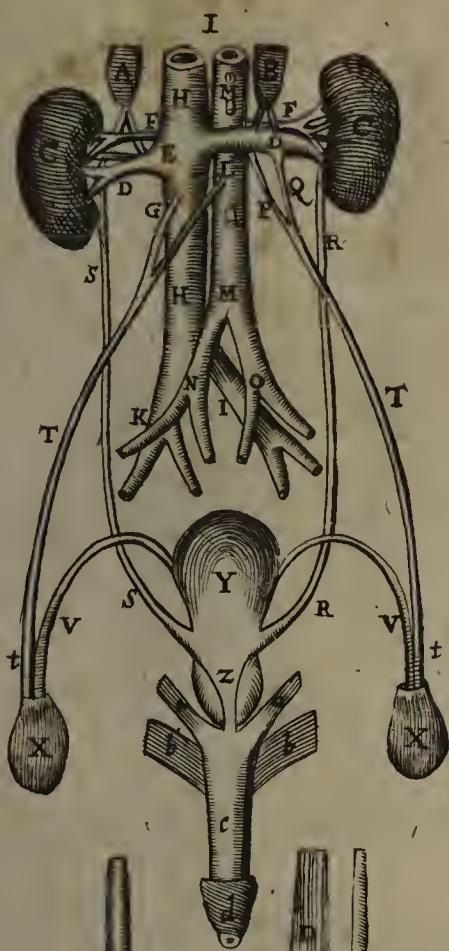
A	The Bladder laid bare from its outward tuni- cle.
BB	A portion of the Ureters.
CC	A portion of the Vasa deferentia.
DD	The Capsulæ.
dd	The end of the Capsulæ.
EE	The Seminal Bladders.
FF	The Glandulæ Prostatae.
GG	The Urethra.
HH	The Muscles which erect the Yard.
II	The Muscles which dilate the Urethra.
KK	The two Nervous bodies of the Yard.
L	The Preputium drawn back.
M	The Glans with its Bridle.

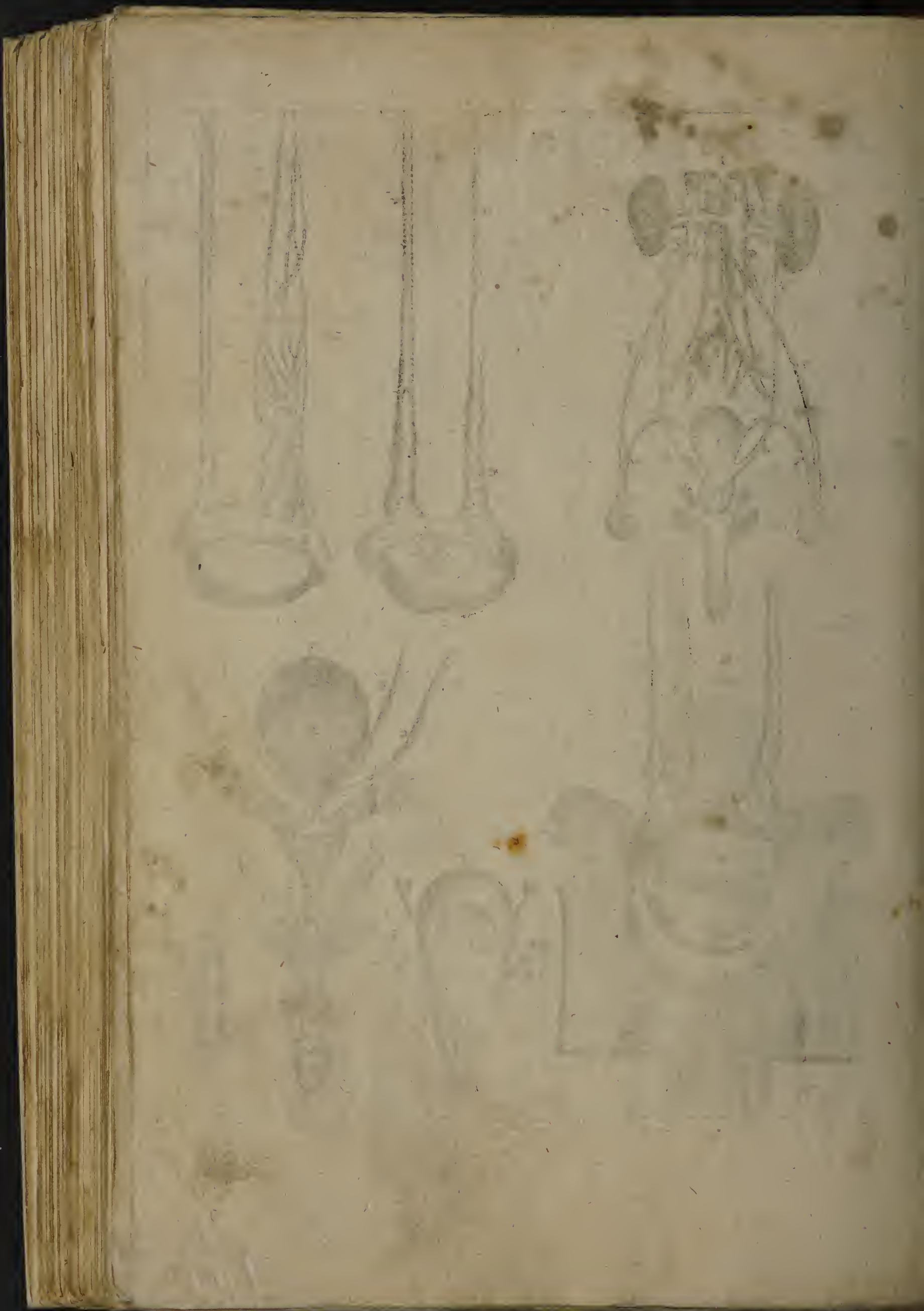
FIG. VI.

A	The internal tunicle of the Bladder being open.
BB	Part of the Ureters.
CC	The Orifice of the Ureters as they are diducted into the Bladder.
DD	The beginning of the Capsulæ.
EE	The Seminal Bladders.
GG	The Glandulæ Prostatae divided.
L	The hole in the Capsulæ passing into the begin- ning of the Urethra, which is covered with a shutter.

FIG. VII.

A	The Membrane of the nervous body of the Yard separated.
B	The blackish marrow of the same body.
C	The Glans laid naked.





AN EXPLANATION OF THE TABLE OF THE MINT IN BRASS PLATE IN THIS BOOK

The Table comprehends all the Coins which are found in the
Mint, and their Value in the Pound.

The Name of the Coin	The Value	The Weight
The King of Great Britain	1	113 Grains
The Queen of Great Britain	1	113 Grains
The Prince of Wales	1	113 Grains
The Duke of Cornwall	1	113 Grains
The Duke of Devonshire	1	113 Grains
The Duke of Somerset	1	113 Grains
The Duke of Northumberland	1	113 Grains
The Duke of York	1	113 Grains
The Duke of Gloucester	1	113 Grains
The Duke of Kent	1	113 Grains
The Duke of Cambridge	1	113 Grains
The Duke of Cornwall	1	113 Grains
The Duke of Devonshire	1	113 Grains
The Duke of Somerset	1	113 Grains
The Duke of Northumberland	1	113 Grains
The Duke of York	1	113 Grains
The Duke of Gloucester	1	113 Grains
The Duke of Kent	1	113 Grains
The Duke of Cambridge	1	113 Grains
The Duke of Cornwall	1	113 Grains
The Duke of Devonshire	1	113 Grains
The Duke of Somerset	1	113 Grains
The Duke of Northumberland	1	113 Grains
The Duke of York	1	113 Grains
The Duke of Gloucester	1	113 Grains

AN EXPLANATION OF THE TABLE
OF THE NINTH BRASSE
PLATE IN THIS BOOK.

This Table comprehends all the Bowels which are found in the
Abdomen, and Breast of the Infant.

F I G. I.

Singularly expresseth the Lacteal Veins, as they
are represented at a single view.

- AAA The hollow part of the Liver.
B The Gall.
CC The umbilicar vein bowed upward.
DD The Stomach turned upwards.
E Its lower Orifice tyed with a string.
F A portion of the Jejunum cut off neer the
Pylorus.
GGG The Pancreas of a famous bigness.
H The Spleen.
II The right Kidney covered with the common
Membrane.
K The left Kidney in like manner covered.
LLL The Mesenterium stretched abroad.
MM &c. The Guts knit to the Mesenterium.
aaaa Certain Lacteal veins stretched from the
Sweet-bread to the Liver, whereof few, and
those the least of them are here expressed.
bbb &c. Lacteal veins distributed from the Sweet-
bread to the Guts, and those bigger.
ccc &c. The Meseraick branches of the Vena porta.
dd &c. Branches of the Meseraick arteries.

F I G. II.

- A The right Renal Glandula.
B The right Kidney.
C The left Glandula of the Reins.
D The left Kidney.
E The Vena Cava descending.
FF Its internal Iliack branches.
GG The external Iliack branches of the Vena Ca-
va.
HHH The great artery with its external Iliack bran-
ches.
II The internal branches of the great artery.
KK &c. Both Umbilicar arteries bent downwards.
L The bottom of the womb compressed.
M The neck of the womb.
N The bladder turned downwards.
O The Urachos.
P The node of the Navil cut off.

- a The vein of the right Renal Glandula.
b The artery of the right Renal Glandula.
c The right emulgent artery.
d The right emulgent vein.
e The right spermatical vein.
f The right spermatical artery.
g The left artery of the Renal Glandula.
h The left vein of the Renal Glandula.
i The left emulgent vein.
k The left emulgent artery.
l The left spermatical vein.
m The left spermatical artery.
nn The Vessels preparing the Seed.
oo The testicles of a great magnitude.
pp The broad Ligaments of the womb.
qq &c. The Tubæ of the womb bowed down.
rr The round Ligaments of the womb cut off
below.
ss Portions of the Ureters cut off.

F I G. III.

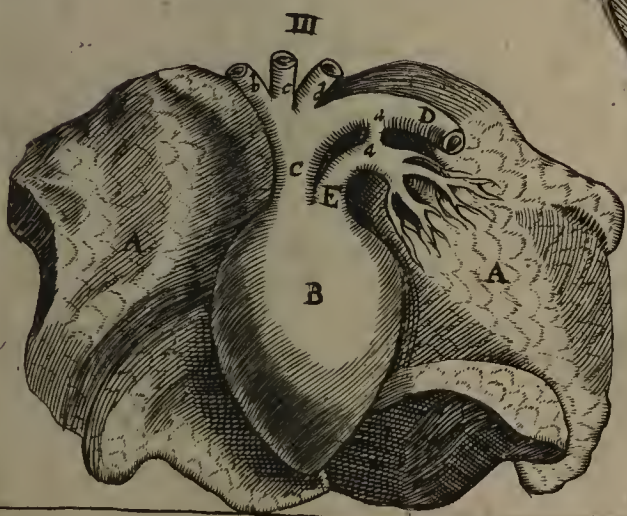
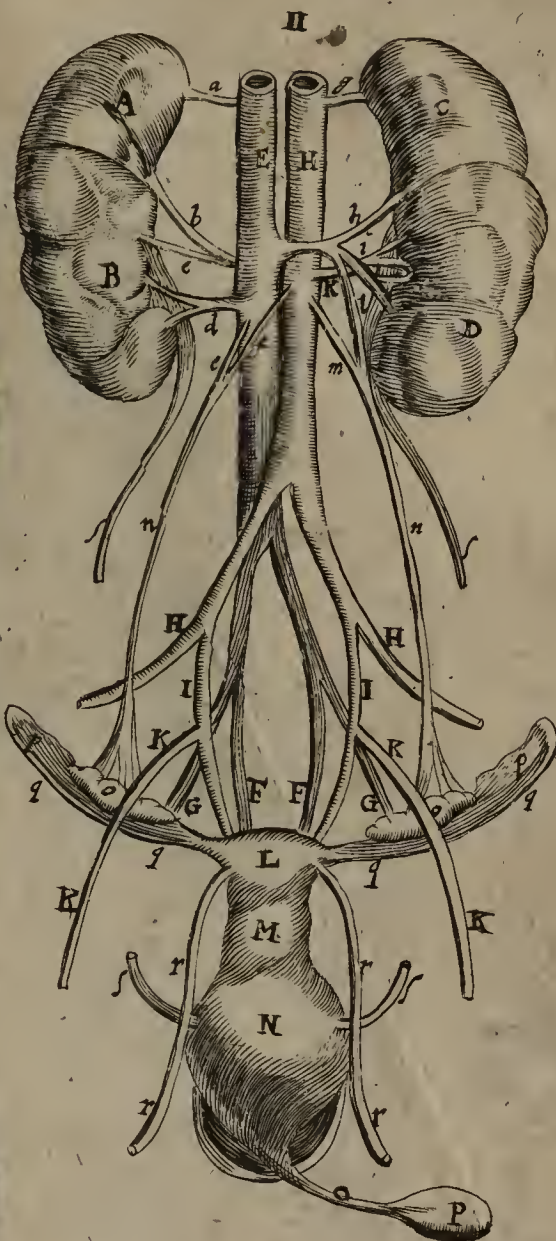
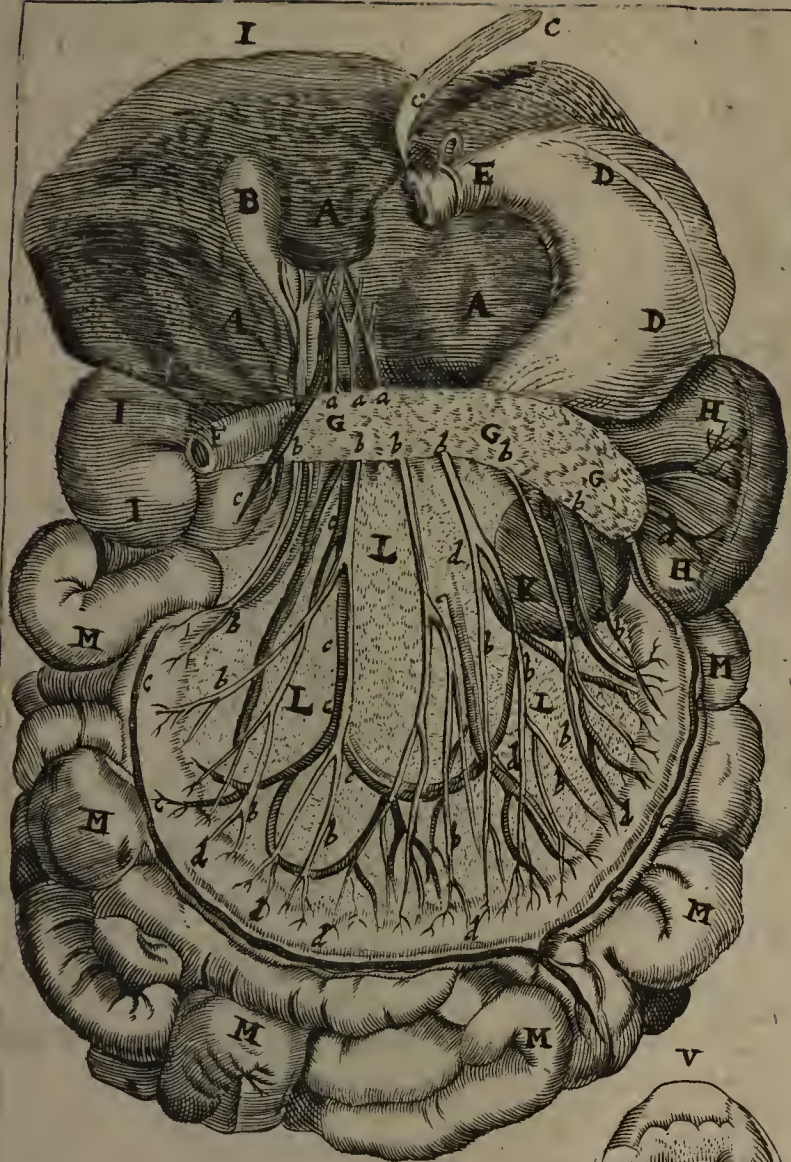
- AA The Lunges diducted on both sides.
B The Heart whol.
C The trunk of the great artery coming from the
Heart.
D A portion of the same artery passing down-
wards.
E The Vena Arteriosa stretched from the Heart.
aa The channel between the Vena Arteriosa and
the great Artery.
b The beginning of the right subclavian artery.
c The beginning of the right Carotides.
d The beginning of the left Artery Carotides.

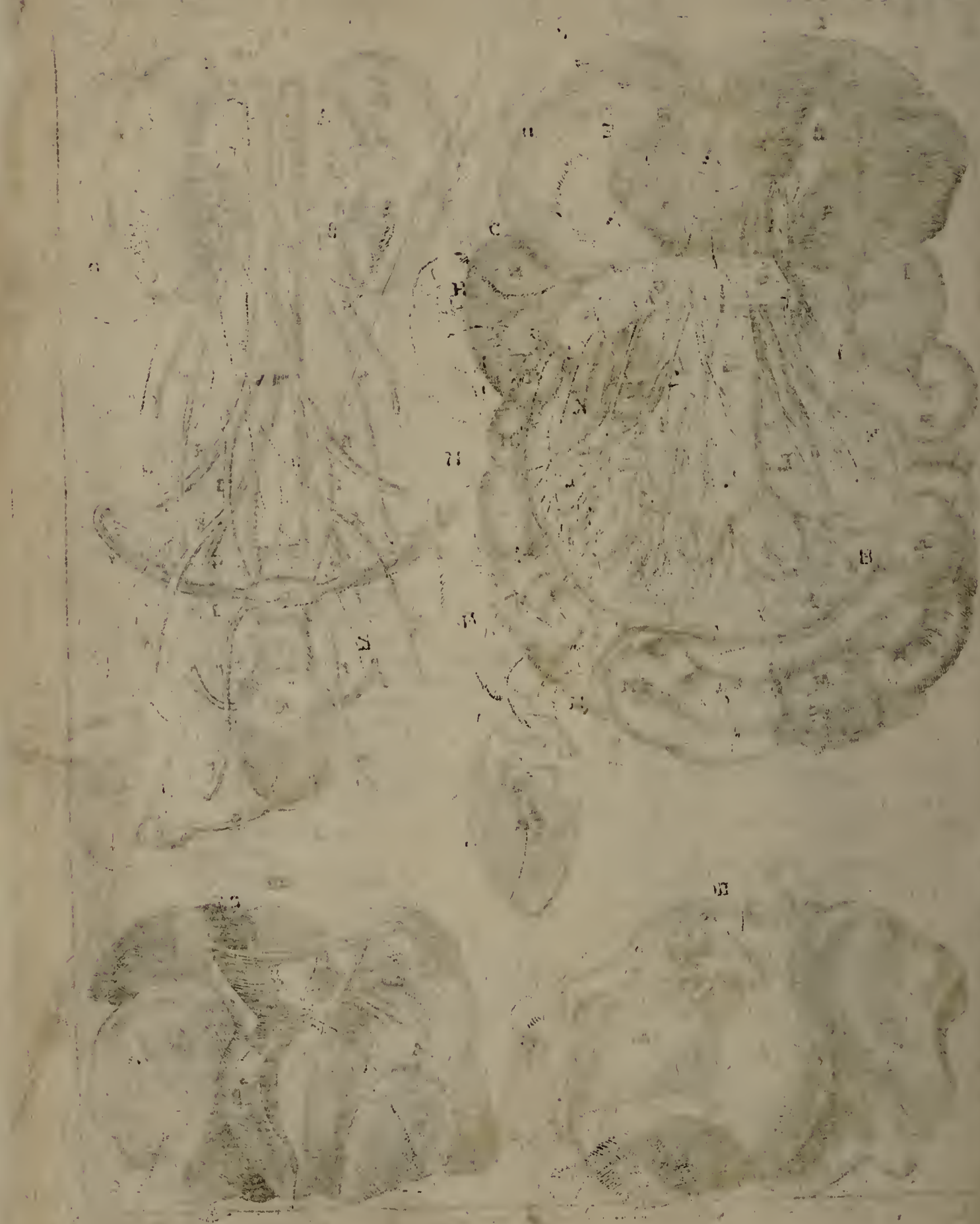
F I G. IV.

- AA The Lunges diducted.
B The Heart cut towards the right Ventricle.
C The Vena Cava opened neer the Heart.
D Anastomosis between the Vena Cava and Ar-
teria Venosa.
E The shutter in the Anastomosis.

F I G. V.

- A The Corpus Thymium separated from the
Vessels of the Heart.





AN EXPLANATION OF THE TABLES OF THE TENTH CLASS

This Table represents the ...

TABLE I.		TABLE II.	
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AN EXPLANATION OF THE TABLE
OF THE TENTH BRASSE
PLATE IN THIS BOOK.

This Table represents the Muscles and bones of the Breast,
its Membranes and Diaphragma.

FIG. I.

- A* The Pectoral Muscle in his scituation.
B The same Muscle out of his scituation.
C Serratus major anticus in its scituation.
D The same a little removed out of it.
E Serratus anticus minor totally in its scituation.
F The subclavian Muscle in its scituation.
f The Clavicula bowed back under the pectoral Muscle.
gg Platysma myodes in the neck with their right strings.
GG &c. The external intercostal muscles without their scituation.
HH &c. The internal intercostal muscles in their scituation.
II A portion of the Diaphragma in its scituation.
K Part of the great artery descending.
L The hole for the Gula passing the Diaphragma.
M The hole for the Vena Cava descending.
NN The square muscles of the loyns in their scituation, of which Chap. 12.
oo The muscles called Psoas in their scituation, of which Chap. 19.

FIG. II.

Shews the bones of the breast as they are to
be seen forwards.

- AA* The Sternum.
B The Mucronata, or sword-like Cartilage.
CC &c. The cartilaginous part of the Ribs.
1.2.3.4.5.6.7. The true Ribs.
8.9.10.11.12. The bastard Ribs.

FIG. III.

Shews the Ribs, Vertebrae and processes
on the back part.

FIG. IV.

- The Breast opened, in which
- AA* The Mediastinum drawn to the side.
BB The tunicle of the Mediastinum diducted under the Sternum.
C The right lobe of the Lungs.

FIG. V.

- AA* Part of the Pleura drawn at one side from the Ribs.
BB The Ribs laid bare from the Pleura.
CC The Ribs cloathed with the Pleura.

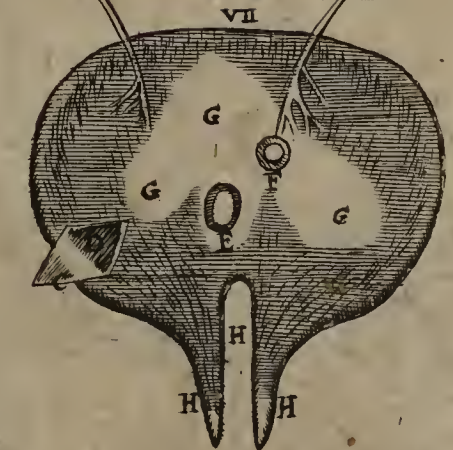
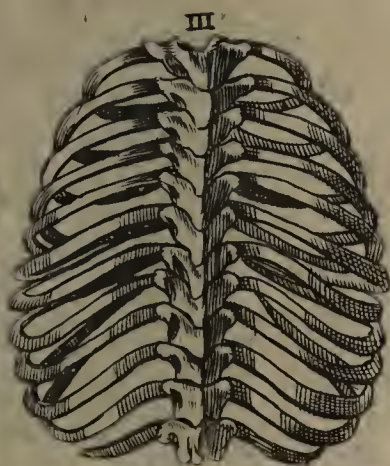
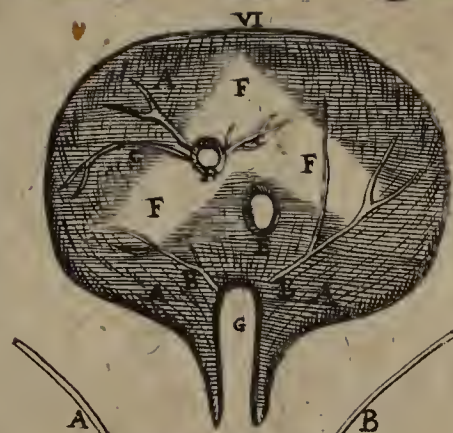
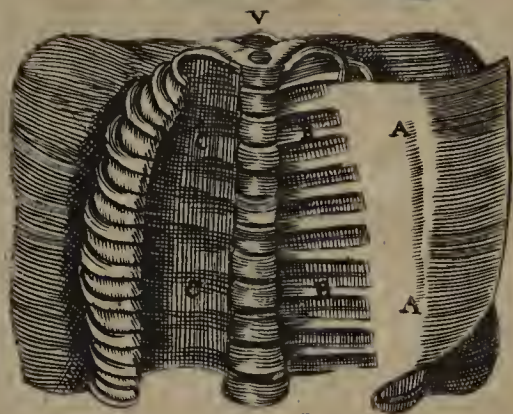
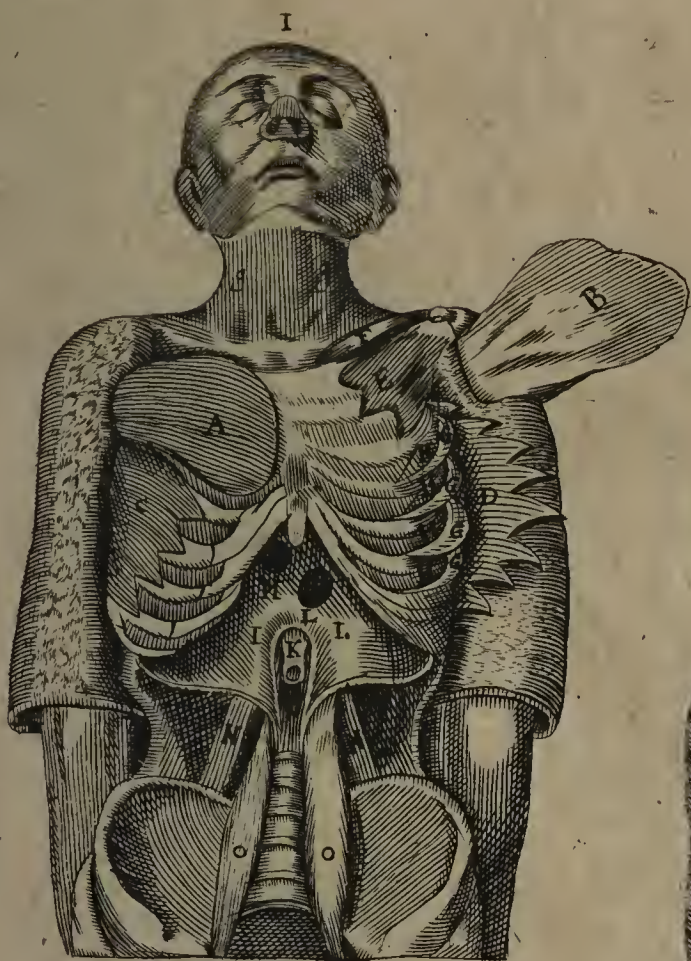
FIG. VI.

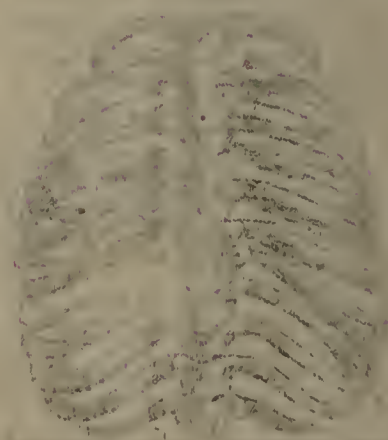
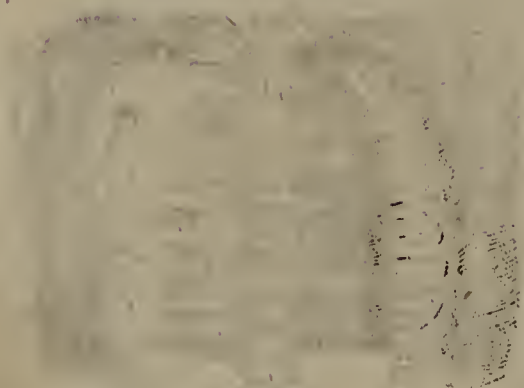
Shews the Diaphragma separated from the
Ribs and Vertebrae.

- AAA* The fleshy part of the Diaphragma covered with its Membrane.
BB The Phrenical arteries.
CC The Phrenical veins.
D The passage of the Vena Cava.
E The passage of the Gula.
FFF The membranous part of the Diaphragma.
G The hole between the fleshy portions of the descending of the great artery.

FIG. VII.

- A* The left nerve of the Diaphragma.
B The right nerve of the same.
C The superior membrane of the Diaphragma separated.
D The fleshy substance of the Diaphragma.
E The hole for the Gula.
F The hole for the Vena Cava.
GGG The Membranous part.
HHH The fleshy parts between with the great artery descends.





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AN EXPLANATION OF THE TABLE
OF THE ELEVENTH BRASSE
PLATE IN THIS BOOK.

This Table chiefly represents the Heart, its Membranes, Vessels, Ventricles
and shutters, then the Lungues and the *Aspera Arteria*
separated from them.

FIG. I.

- A The Pericardium compassing the Heart.
- BB The Lungues embracing the Heart in their Natural Scituation.
- C The Vena Cava ascending above the Heart.
- D The beginning of the vein without a fellow.
- E The right subclavian vein.
- F The right Jugular vein.
- G The left Jugular vein.
- H The left subclavian vein.
- II The right and left Carotis Artery.
- KK The right and left subclavian Artery.
- LL The Nerves of the sixt pair descending to the Lungues.
- M The beginning of the great Artery descending.

FIG. II.

Shews particularly the vessels passing from the Heart to the Lungs; which are shewed you separated in the third and sixt figure of the following Chapter.

- A The Pericardium taken from the Heart.
- B The Heart with the Coronal veins and arteries.
- C The trunk of the great Artery passing out of the Heart.
- D Its descending part turned upwards.
- EE The left branch of the Arterial vein distributed to the Lungues.
- F A channel between the arterial vein, and the great artery.
- G The right branch of the arterial vein.
- HH The right and left branch of the venal artery.
- I The Ear of the Heart.
- KK The Lungues about the Heart.
- L The proper tunicle of the Lungues separated.

FIG. III.

The Heart of an Infant whol.

- A The proper Membrane of the Heart separated.
- B The substance of the Heart bare.
- CC The right and left Ears of the Heart.
- D The great Artery sticking out of the Heart.
- E A portion of the Vena Cava.

FIG. IV.

- A Part of the Heart transversely cut.
- B The left ventricle.
- CC The right ventricle conspicuous.
- DD The Septum of the Heart.

FIG. V.

Shews the Vena Cava dissected with the right Ventricle.

- A The Orifice of the coronal Vein.
- B The Anastomosis between the Vena Cava and the venal artery.
- CCC The shutters called Tricuspides.
- DDD The right Ventricle of the Heart opened.
- aa The passages between the Membranes ending in the Septum.

FIG. IV.

- A The arterious vein dissected in the right ventricle.
- BBB The shutters called Sigmoides in the arterious vein.
- CCC The right Ventricle of the Heart opened.

FIG. V.

- A The great Artery dissected near the Heart.
- BBB The semilunar shutters of the great artery.
- CC The left Ventricle of the heart.
- D Part of the left Ventricle turned back.

FIG. VI.

- A The Venal artery dissected.
- B The beginning of the Anastomosis between the venal artery and the Vena Cava.
- bb The passages between the Membranes ending in the Septum.
- CC The two mitral shutters.
- DD The left Ventricle of the Heart opened.

FIG. VII.

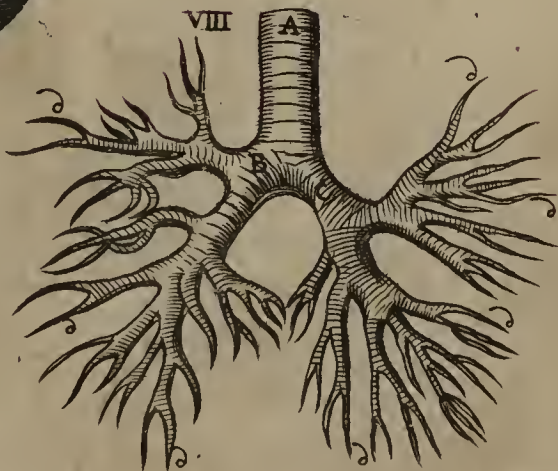
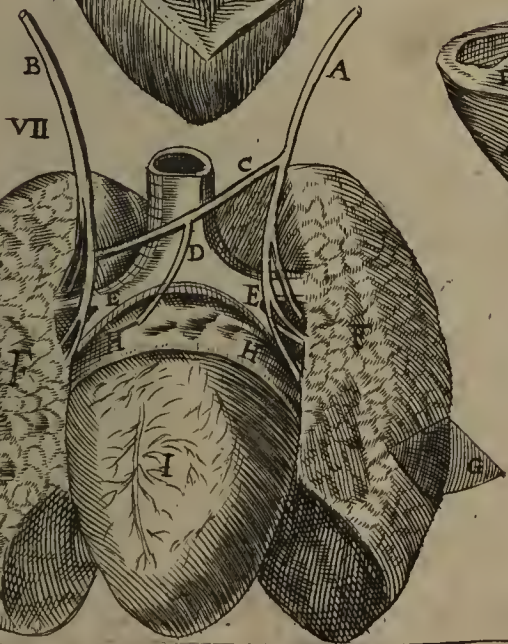
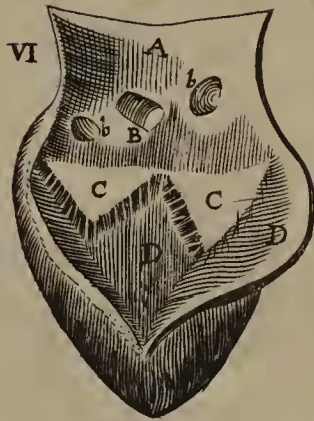
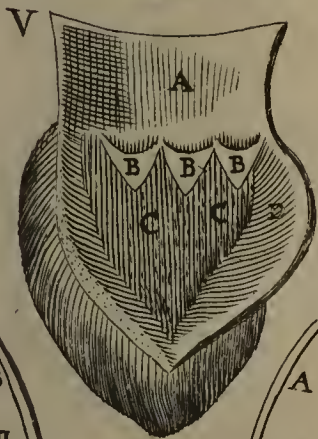
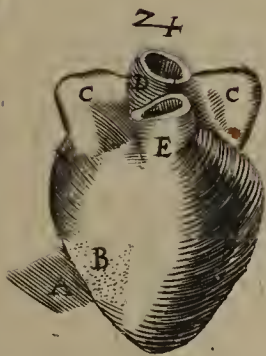
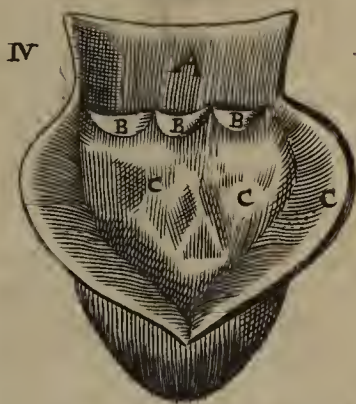
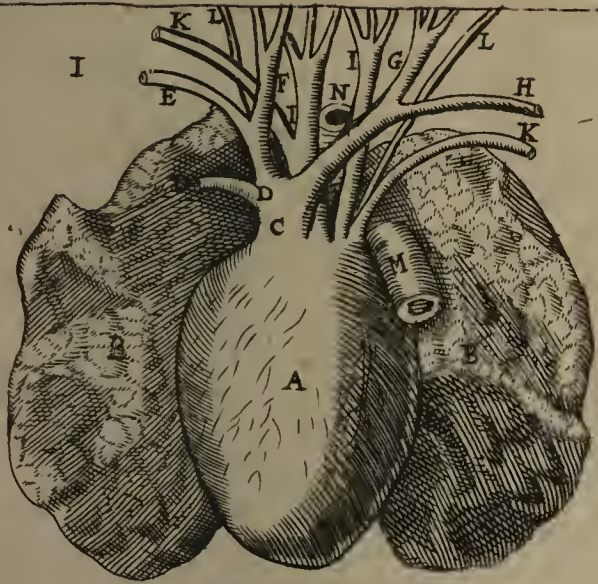
Shews the backward part of the Lungues and wind-pipe, as they are joyned to the Heart.

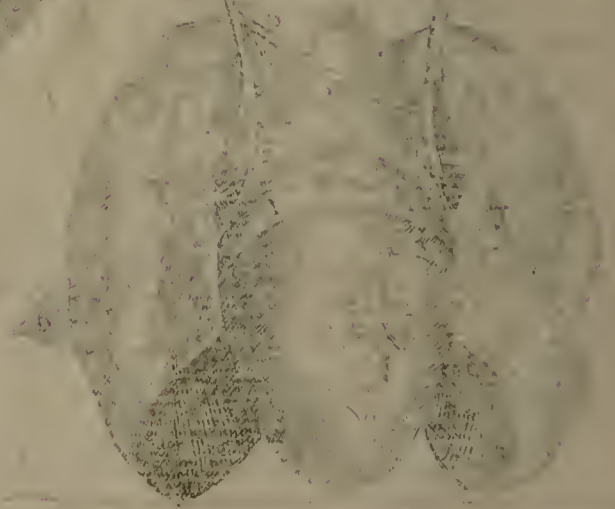
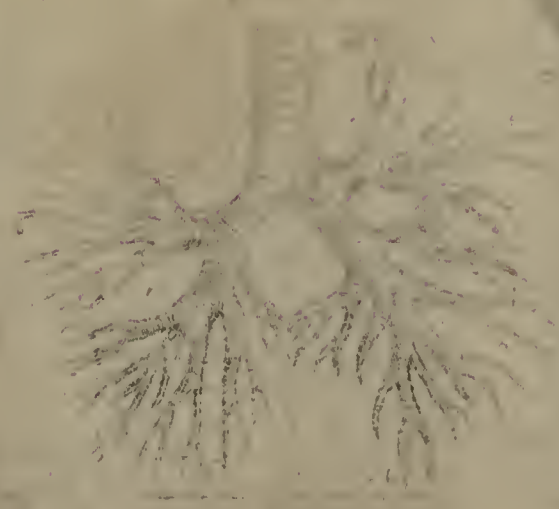
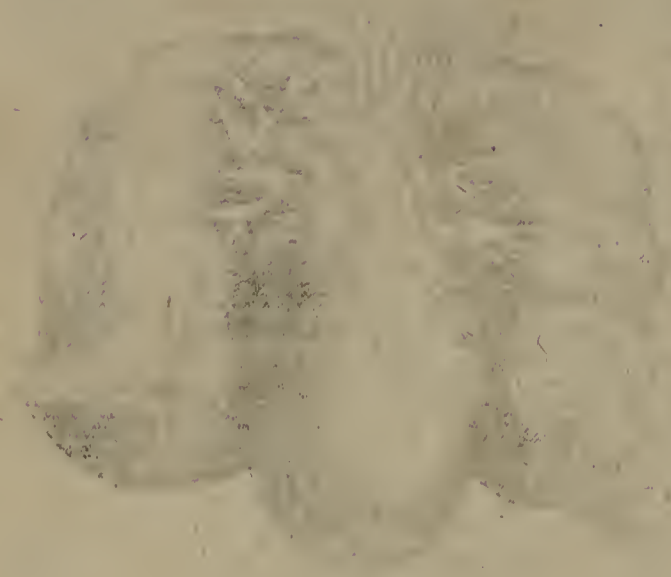
- A The right Nerve of the sixt pair which comes to the Lungues.
- B The left Nerve of the same.
- C The middle branch between each Nerve.
- D The branch which is carried to the Pericardium.
- EE The two greater branches of the windpipe which are Membranous behind.

- FF The hinder part of the Lungues.
- G The proper Membrane of the Lungues.
- HH A portion of the Pericardium left.
- I The heart left in his Scituation.

FIG. VIII.

- A The wind-pipe cut off under the Larynx.
- B The right branch thereof divided first into two parts.
- C The left branch thereof divided into greater and lesser branches.
- ddd &c. The extremity of the branches ending in membranous channels.





AN EXPLANATION OF THE TABLE OF THE TWELFTH BRASSE PLATE IN THIS BOOK.

FIG. I.

Shews the *Vena Cava*.

- A** The beginning of the *Vena Cava*, with his large orifice about the Heart.
- BB** The rise of the subclavian branches.
- C** The beginning of the descending trunk.
- DD** The right and left Iliack branches.
- aaa &c.** The branches of the *Azygus* distributed to the Ribs.
- bb** The superior intercostal.
- cc** The internal mammary.
- *** The Mediastina.
- dd** The Vertebral Vein.
- ee** The internal Jugular cut off under the skull.
- ff** The external Jugular, from which the inferior branch riseth to the Organ of speech, and the Subcutaneous by the face and Temples, and backwards by another branch to the Ears.
- gg** The Cervical Vein.
- hh** The progress of the subclavian branches.
- ii** The internal scapular vein.
- KK** The external scapulars.
- 3.3.** The vein carried to the Muscle Deltois.
- ll** The superior Breast-vein.
- mm** The Cephalick vein cut off.
- nn** The basillick vein cut off.
- oo** The inferior Breast-vein.
- p** The left phrenical vein.
- q** The right phrenical vein.
- rr** A famous branch distributed in the Liver.
- ss tt &c.** The sprigs thereof distributed in the right and left side thereof.
- uu** The *Venæ musculæ*, or superior Lumbals.
- yy** The veins of the Renal Glandulæ.
- xx** The right and left emulgent.
- zz** The right and left spermatical.
- aa** The beginning of the Lumbals.
- ββ** The *Vena muscula* of the inferior Lumbal.
- γγ** The *Vena sacra*.
- ΔΔ** The external Iliack branch.
- EE** The Epigastrick vein.
- δδ** The internal Iliack branch.
- εε** *Vena Glutea*.
- ζζ** The Hypogastrick veins.
- ηη** The veins of the Privities.
- θθ** The inguinal veins.
- KK &c.** The branch of the crural vein.
- iii** The Saphena.
- λλ** The vein Ischias.

FIG. II.

Particularly describes the coronal vein of the heart.

FIG. III.

Shew the Arterial Vein of the Heart.

- A** The beginning by which it passeth out of the right ventricle.
- BB** Its branches which pass to the right part of the Lungues.
- CC** Its branches which pass to the left.

FIG. IV.

Shews the great Artery,

- A** Its beginning rising out of the heart.

- BB** The beginning and progress of the subclavian branches.
- C** The trunk descending.
- DD** The right and left Iliack branches.
- aa** The artery Carotis.
- bb** Its external branch distributed to the Jaws, Face, and backwards to the Ears.
- cc** The internal Carotis cut off under the skull.
- dd** The vertebral artery in like manner cut off.
- δδ** The cervical muscula.
- ee** The internal Mammary.
- ff** The branches of the superior intercostal artery.
- gg** The internal scapular artery.
- hh** The external scapular artery.
- ii** The superior breast-artery.
- kk** The inferior breast-artery.
- lm** The arteries distributed to the muscles of the Shoulder.
- nn** The inferior intercostals.
- oo** The phrenical arteries.
- p** The famous artery called *Cœliaca*.
- q** Its right branch divided into three parts; of which, the superior and inferior is distributed to the Liver, and the middle to the Gall.
- r** The left branch of the *Cœliacal*.
- s** The right Gastrical artery.
- t** The splenical artery divided in smal branches to the spleen.
- u** The artery called *Epiplœica*.
- ur** The *Gastroepiplœica*.
- x** The artery carried to the Renal Glandula.
- yyy &c.** The superior Mesenterical artery distributed into branches.
- zz** The emulgent arteries.
- aa** The rise of the Lumbal arteries.
- ββ** The spermatical arteries.
- γγ** The inferior Mesenterical artery derived into many branches.
- δ** The *Arteria sacra*.
- ΔΔ** The external Iliack artery.
- δδ** The internal Iliack.
- ηη** *Arteria Glutæa*.
- ζζ** The Hypogastrick artery distributed to the right Gut and Privities.
- ♀♀** The Hypogastrick artery distributed to the womb distinguished from the former.
- εε** The umbilicar artery.
- EE** The Epigastrick artery.
- θθ** The *Arteria Pudenda*.
- ii** The Ischias.
- kk** The inferior *Arteria Muscula*.
- λλ** The artery which goes to the internal Iliack muscle.

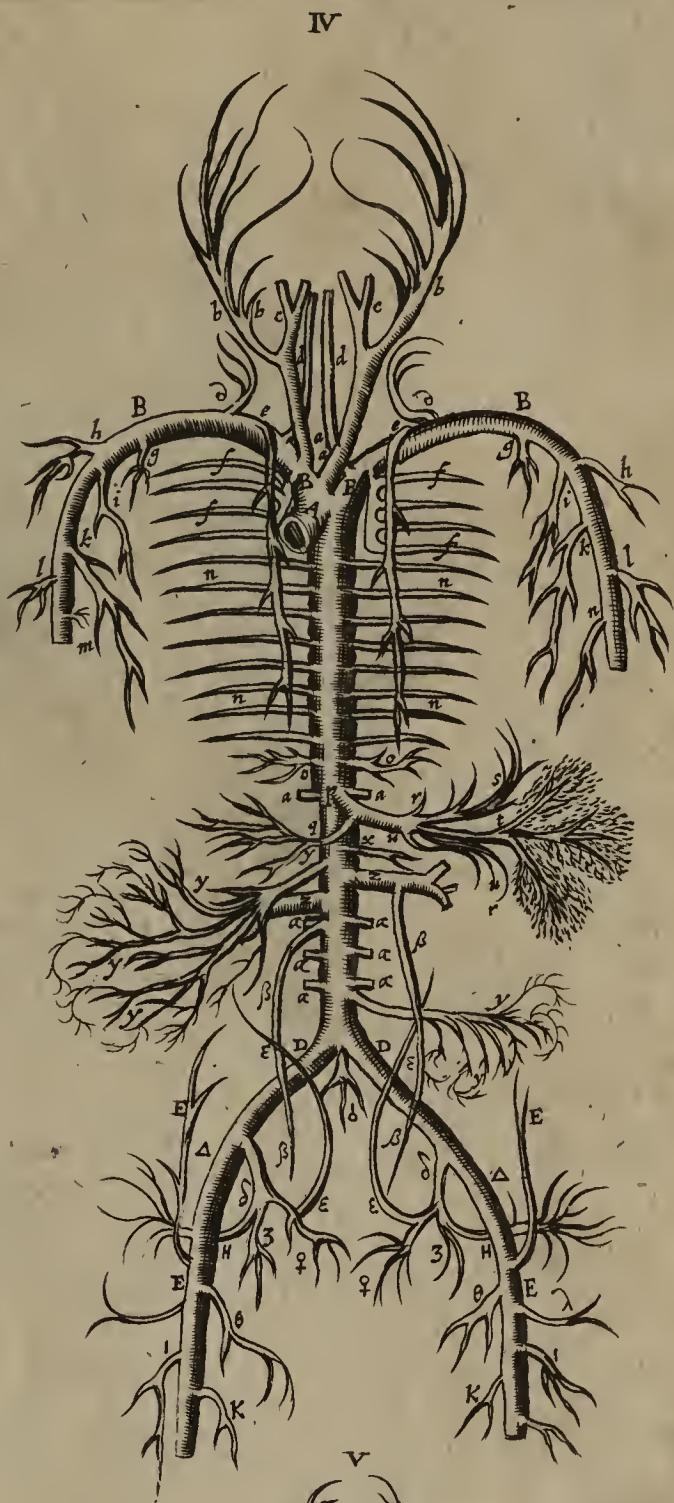
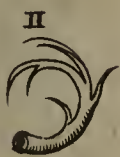
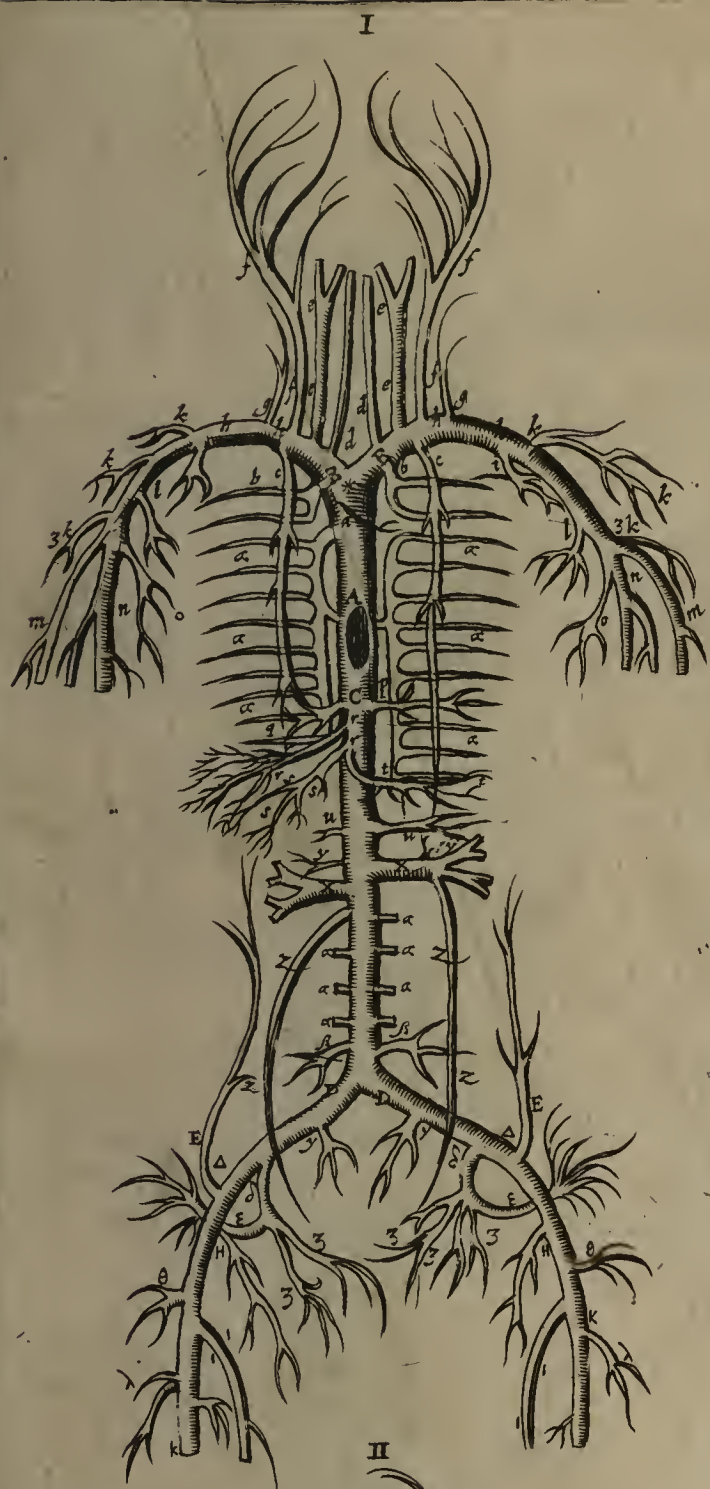
FIG. V.

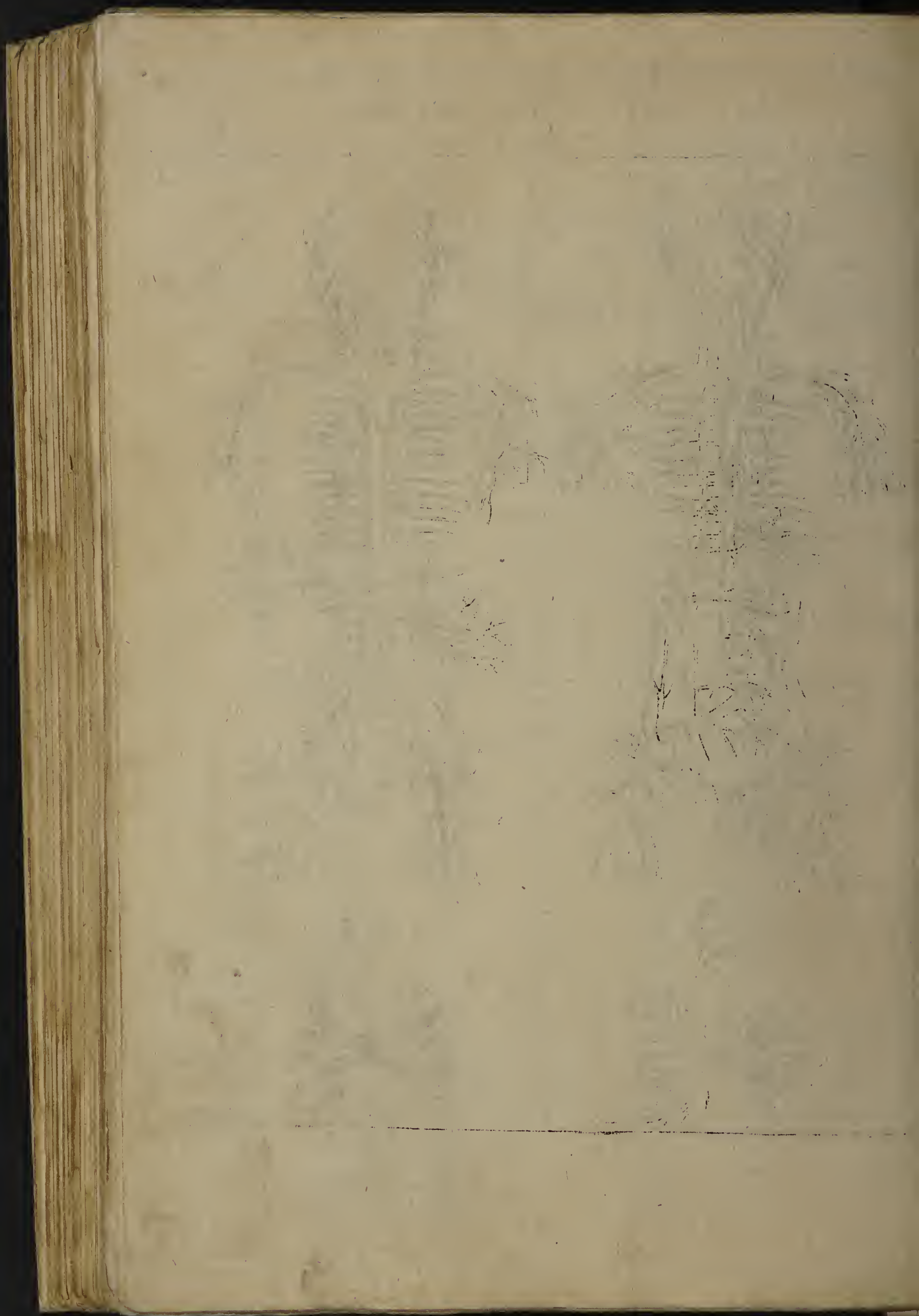
Shews the Coronal Artery of the Heart.

FIG. VI.

Shews the Venal Artery arising from the left Ventricle of the Heart.

- A** Its Orifice.
- BB** Its branches distributed to the right side of the Lungues.
- CC** Its branches distributed to the left.





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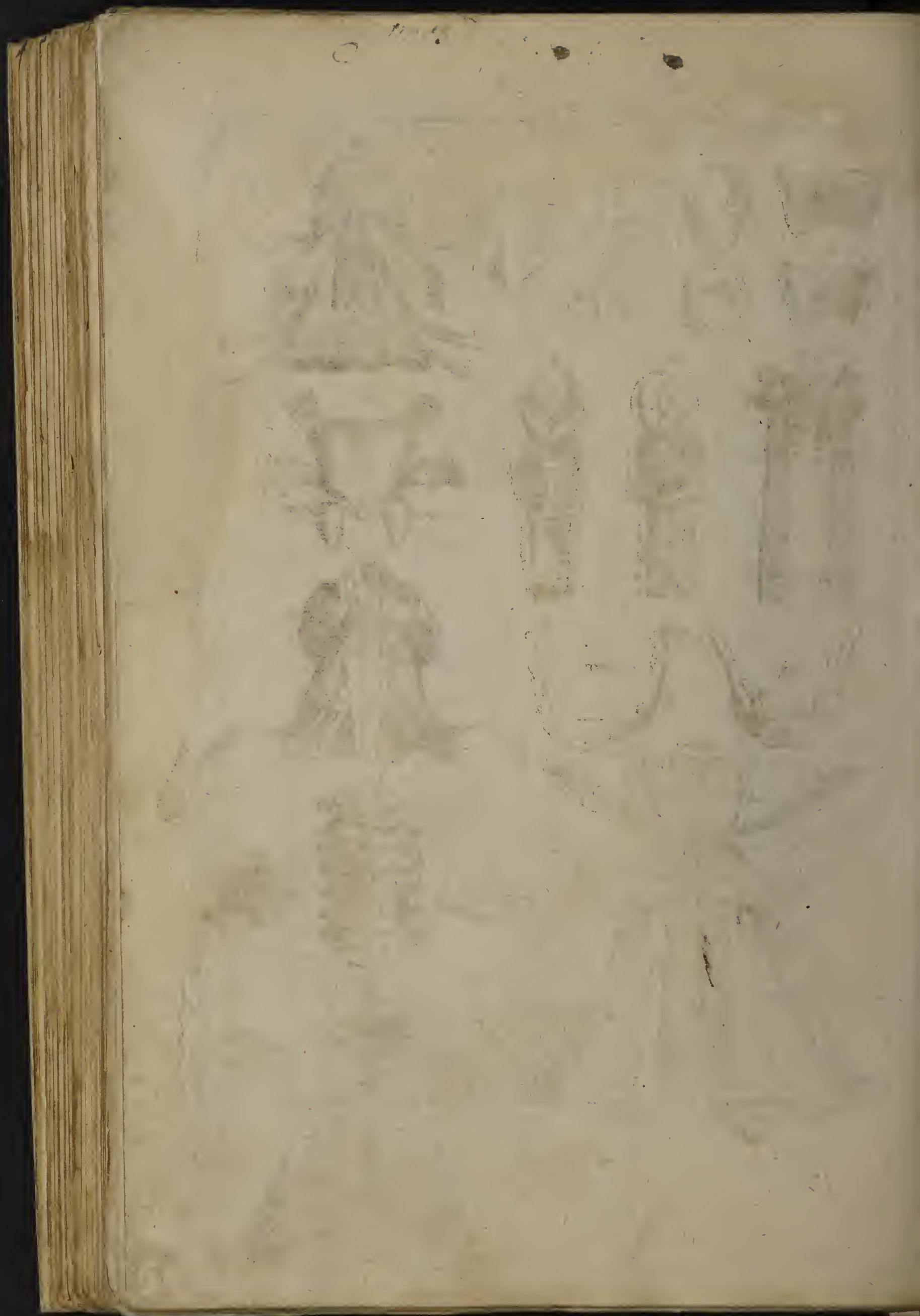
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AN EXPLANATION OF THE TABLE
OF THE THIRTEENTH BRASSE
PLATE IN THIS BOOK.

In this Table is laid open to view, the Cartilages of the *Larynx*, with their Muscles ;
the *Os Hyois* with its Muscles ; the Tongue, its Nerves and Muscles ; the
Uvula with its Muscles ; the Tonfils, the *Vertebra* of the
Neck and its bowing Muscles.

- FIG. I.
The external face of the Buckler-like Cartilage.
- FIG. II.
The internal face of the Buckler-like Cartilage.
- FIG. III.
The hinder view of the Ring-like Cartilage.
- FIG. IV.
A view of the foremost part of the same Cartilage.
- FIG. V. VI.
The Cartilages called *Arytænoides*.
- FIG. VII.
The *Epiglottis*.
- FIG. VIII.
A The Buckler-like Cartilage.
BB The pair of Muscles *Hyothyroides*.
CCCC The pair of Muscles *Sternothyroides*.
DD The small Muscles called *Cricothiroides*.
- FIG. IX.
A The external part of the *Epiglottis* joyned to the
Larynx.
BB The Muscles *Thyroarytænoides*.
CC The lateral Muscles *Cricoarytænoides*.
D The Ring-like Cartilage.
EE The fore part of the wind-pipe.
- FIG. X.
A The internal face of the *Epiglottis*.
aa The sticking out of the cartilages *Arytænoides*.
BB The Muscles *Arytænoides* every where loosed.
CC The Muscles *Cricoarytænoides postici*.
D The broad part of the Ring-like cartilage.
EE The hinder and membranous part of the wind-
pipe.
- FIG. XI.
A The Basis of the *Os Hyois*.
BB The horns of the *Os Hyois*.
CC The two cartilaginous Appendices.
- FIG. XII.
A The internal face of the Basis of the *Os Hyois*.
BB The internal face of the horns.
CC The two cartilaginous Appendices.
- FIG. XIII.
A The sides of the *Os Hyois*.
BB The muscles *Geniohyoides* turned downwards.
CC The internal *Geniohyoides* commonly called
Genioglossi.
- DDDD The muscles *Sternohyoides*.
EE The muscles *Styloceratohyoides*.
FFF The Muscles *Coracohyoides*.
ff The middle tendinous part.
- FIG. XIV.
A The inferior part of the top of the Tongue.
BBBB The muscles *Basioglossi*.
ββ The nervous substance between the muscles,
CC The muscles *Ceratoglossi*.
DD The muscles *Styloglossi*.
EE The muscles *Myloglossi*.
aa The Nerves of the Tongue from the fourth
conjugation.
bb The Nerves of the Tongue from the seventh
conjugation.
- FIG. XV.
A The Gargareon or Uvula.
BB The external pair of Muscles.
bb Its tendon which passeth the chink.
CC The internal pair of muscles something compres-
sed.
D Part of the *Pallat* from which the Uvula hangs.
- FIG. XVI, and XVII.
Shews the Glandulae called Tonfils.
- FIG. XVIII.
AA The long muscles bowing the neck.
BB The muscles bowing the neck called *Scaleni*.
aa Part of the Nerves tending to the arms.
CC The muscles bowing the Head with the *Ma-
stoides*.
- FIG. XIX.
Shews the seven joynts of the neck.
- FIG. XX.
The first joynt of the Neck, in which
aa The two holes holding the hinder part of the
Head.
bb The holes on the sides which gives passage to the
arteries to ascend.
- FIG. XXI.
The second *Vertebra* of the Neck.
a The tooth-like process.
b The *Spina Bifida*.
- FIG. XXII.
a The Spine : the rest is like the other joynts.





AN EXPLANATION OF THE TABLE
OF THE FOURTH IN BRASS
PLATE IN THIS BOOK.

THESE TABLES ARE THE PROPERTY OF THE
MUSEUM OF THE CITY OF LONDON.

TABLE I.		TABLE II.	
1	100	1	100
2	200	2	200
3	300	3	300
4	400	4	400
5	500	5	500
6	600	6	600
7	700	7	700
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11	1100	11	1100
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91	9100	91	9100
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94	9400	94	9400
95	9500	95	9500
96	9600	96	9600
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AN EXPLANATION OF THE TABLE
OF THE FOURTEENTH BRASSE
PLATE IN THIS BOOK.

It contains the Muscles which are conspicuous about the Shoulders, Back, Loyns, and Neck, the Carcass being turned over upon the Belly.

FIG. I.

- AA The muscles Trapezii in their situation.
BB The Rhomboides laid a little to view.
CC DD The broadest muscle of the back, in which
CC Shews its fleshy part.
DD Its membranous beginning.

FIG. II.

- AA Trapezius pulled out of its situation.
BB The Rhomboides laid open in its situation.
C The same drawn out of his situation, as yet
joyned to the basis of the Scapula.
DD Both the Levators of the Scapula.
E Serratus posticus minor in his situation.
F Serratus posticus major in his situation.
G The same muscle out of his situation.
HH The greatest part of the Musculi Splenii con-
spicuous in their situation.
II A portion of the Musculi complexi.
KK The Mastoides somewhat separated above.
LL The Sacrolumbi not removed out of their
place.
MM The longest muscles of the back not separated.
NN The beginnings of the Sacrolumbi and longest
muscles united.
OO The muscles Quadrati somewhat laid open.

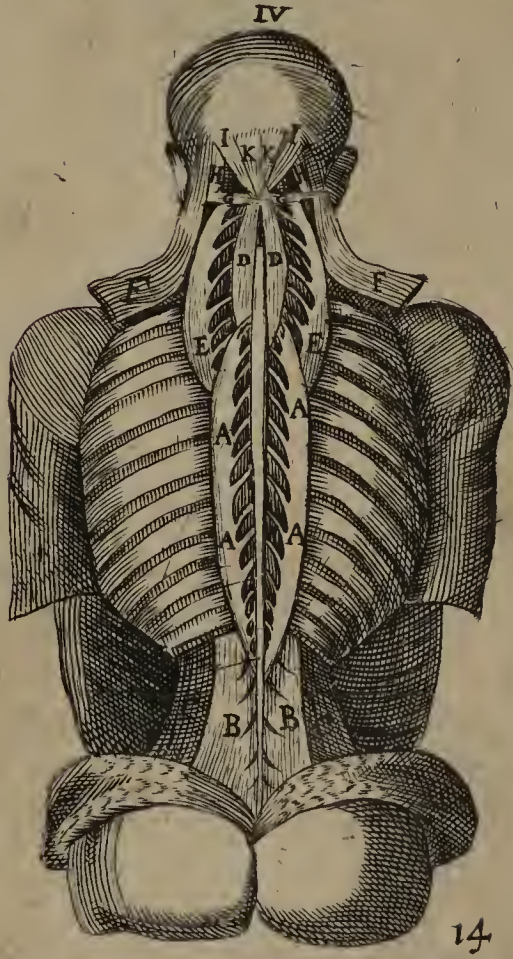
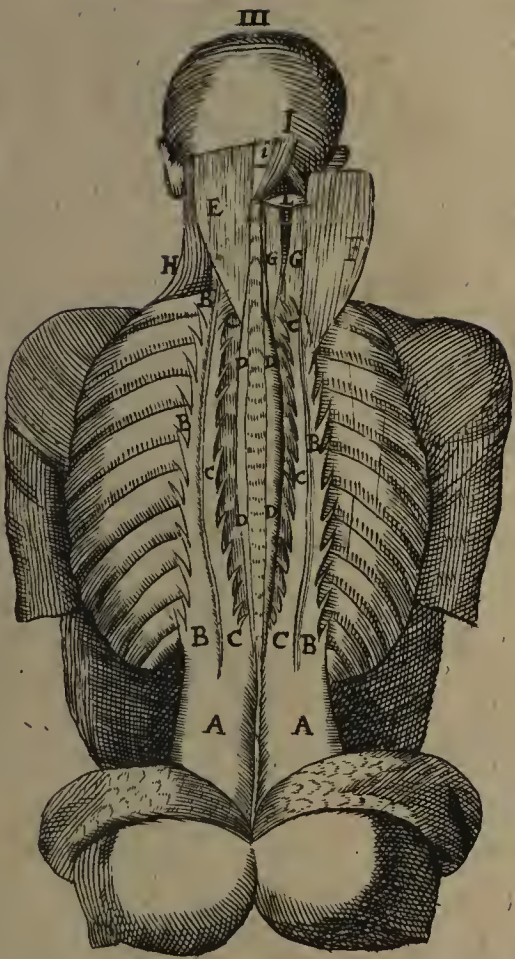
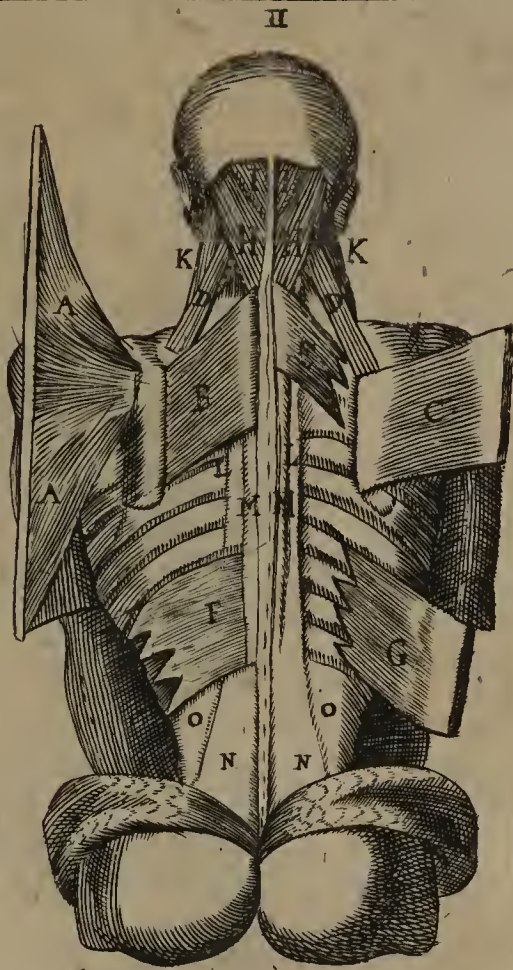
FIG. III.

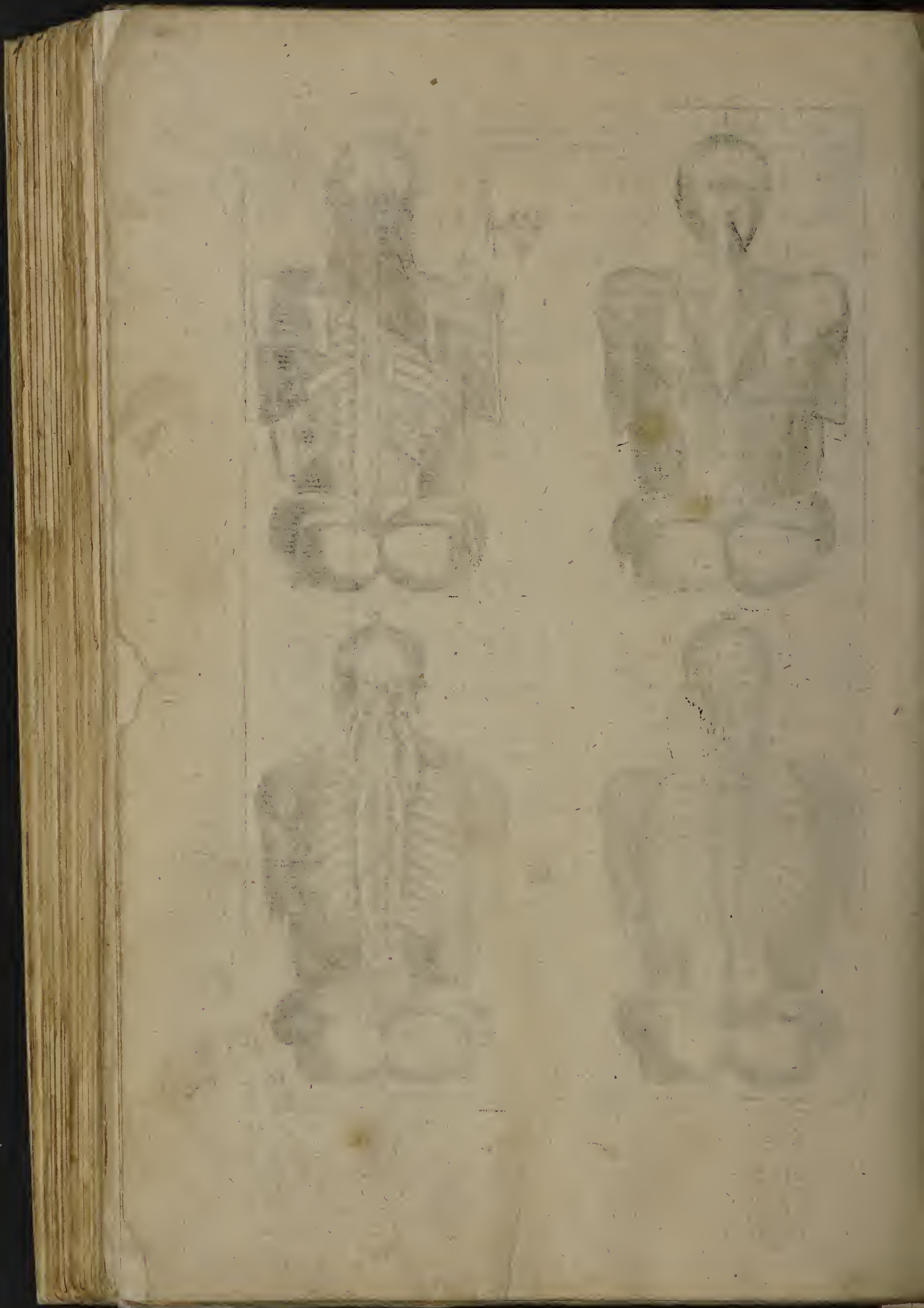
- AA The beginnings of the muscles Sacrolumbi
and the longest united.
BBBB The Sacrolumbi something moved out of their
place and distinguished in their tendons.
CCCC The longest muscles of the back somewhat re-

- moved, and distinguished into their tendons.
DD The Musculi Spinati not separated.
E The Muscle Complexus in its situation.
F The same separated from the Head, that so
the rest may come to view.
GG The Muscles extending the neck in their sci-
tuation.
H The fore part of the Mastoides loosed.
I The greater right muscle of the Head, drawn
a little out of his place, that so the lesser right
muscle may appear.
K The superior oblique muscle of the Head.
L The inferior oblique Muscle.

FIG. IV.

- AA &c. The Musculus Spinatus pulled out of his
place, that so the tendons may be beheld in
their order; they are described at the big-
gest.
BB The muscles of the Loyns called Sacer in his
place.
CC A portion of the muscles Quadrati in their
place.
DD The muscles Spinati in their place.
EE The transverse muscles of the neck decipho-
red greater and longer than they should be,
that so the tendons may be the better seen.
FF The Mastoides separated from the Sternum,
and turned back.
GG The inferior oblique muscles of the Head.
HH The superior oblique muscles of the head.
II The greater right muscles of the head some-
thing drawn aside.
KK The lesser right muscles of the head in their
place.





THE HISTORY OF THE
CITY OF BOSTON
FROM 1630 TO 1880

AN APPENDIX OF THE OF THE CITY OF BOSTON 1880

Table with multiple columns and rows of text, likely a list or index. The text is extremely faint and illegible due to the quality of the scan. The table appears to have several columns, possibly for names, dates, and descriptions.

AN EXPLANATION OF THE TABLE
OF THE FIFTEENTH BRASSE
PLATE IN THIS BOOK.

This Table contains the Muscles of the Face and inferior Jaw ; also the bones
of the Skull, and of both Jaws.

FIG. I.

- AA The skin of the Head detracted.
BB The fleshy Pannicle separated.
CC The Pericranium detracted.
DD The Skull bare.
E The muscle of the Forehead.
FF The muscle that shuts the Eye-lids.
G The first muscle of the Nose.
H The second muscle of the Nose.
I The muscle dilating the wings.
K The muscle of the first pair lifting up the Lips.
L The muscle drawing the Lip upwards.
M The muscle drawing the Lip downwards.
NN The muscle shutting the Lips.
O The Buccinator.
PP The temporal muscle in his place.
Q The muscle lifting up the Ear.
R The muscle drawing the Ear obliquely.
S The muscle Masseter in his place.
TT The muscle Digastricus moved from his beginning.

FIG. II.

- AAA The temporal muscle out of his place, the Jaw being dissected.
aa Its acute insertion into the process of the Jaw.
BB The Masseter separated.
CC The Digastricus loosed at the end, and drawn aside.
DD The internal Pterygoides.
EEEE The external Pterygoides.
F The Musculus Quadratus, or musculous Expansion separated.

FIG. III.

- A The bone of the forehead.
aaa The Coronal Suture.
a The hole of the bone of the forehead for the Nerve of the third pair.
B The right bone of the fore part of the Head.
bb The Sagittal Suture.
C The left bone of the fore part of the Head.
D The bone of the Temples.
cc The false Suture.
d The Duglike process.
e The process of the Os Jugalis.
E The first bone of the upper Jaw.
F The Jugal process.
G The second bone of the Jaw hid with the shadow of the former.
H The third bone.
I The fourth bone of the Jaw.
i The hole in it for the Nerve of the third pair.
K The first bone.
L The lower Jaw.

- l The hole in it for the Nerve of the fourth pair to pass out.
M The sharp process of the inferior Jaw.
N The blunt process of the inferior Jaw.

FIG. IV.

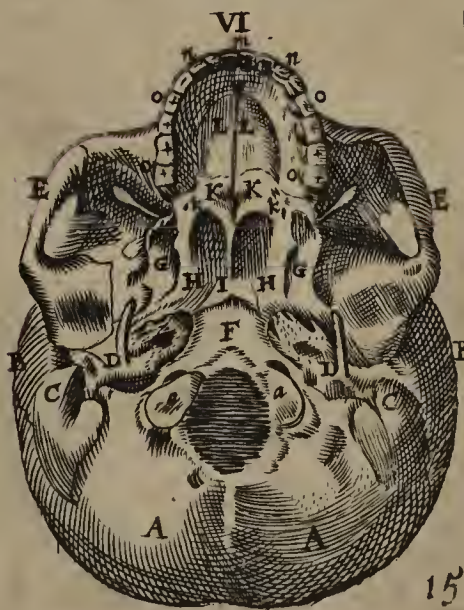
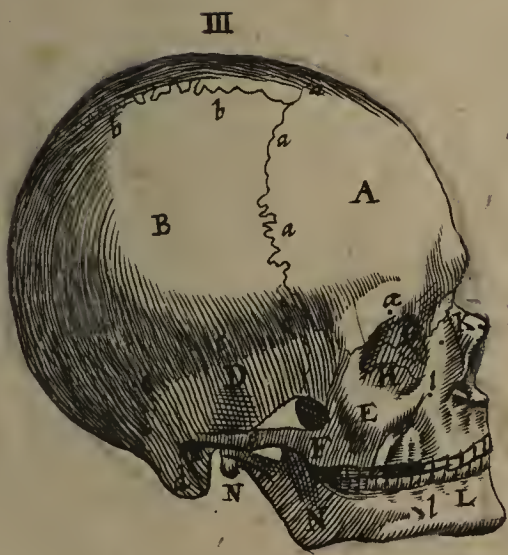
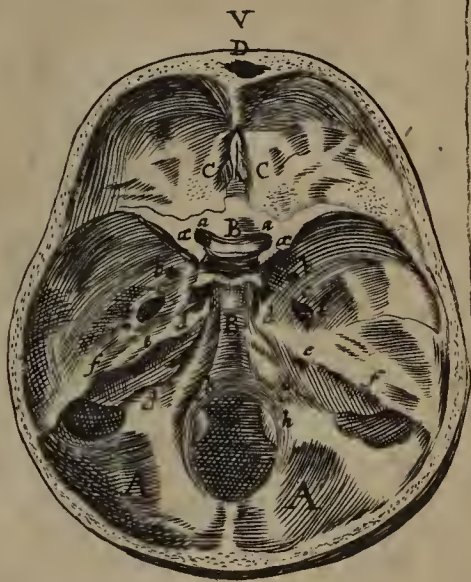
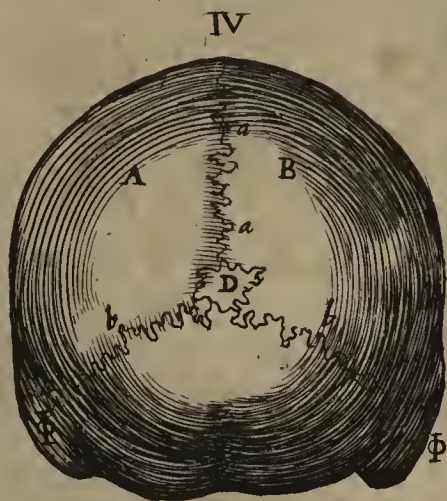
- A The left bone of the fore part of the Head.
aa The sagittal Suture.
B The right bone of the fore part of the Head.
bb The Suture Lambdois.
C The bone of the hinder part of the Head.
D The triangular bone.
Φ A portion of the bone of the Temples with the Duglike process.

FIG. V.

- AA The cavity of the bone of the hinder part of the Head within the Skull, in which the Cerebellum lies.
B The internal face of the Os Sphenois.
CC The Os Ethmois.
D The cavity of the bone of the forehead above the Nose.
aa The first hole in the wedglike bone.
aa The second hole.
bb The third hole.
cc The first hole.
* The seventh hole.
dd The first hole.
ee The first hole of the bone of the Temples.
ff The rocky process of the bones of the Temples.
gg The third hole of the bones of the Temples.
hh The fourth and fifth hole of the hinder part of the Head.

FIG. VI.

- AA The lower part of the bone of the hinder part of the Head conspicuous.
aa The process by which the hinder part of the Head is joyned to the first Vertebra of the Neck.
BB Part of the bone of the Temples.
CC The duglike process.
DD The bodkinlike appendix.
EE The jugal process.
F The External face of the wedglike bone.
GH GH The winglike processes.
I The bone which distinguisheth the Nostrils.
KK The sixth bone of the upper Jaw.
kk The hole which passeth the Nerve of the fourth pair to the Pallat.
LL Part of the fourth bone of the superior Jaw.
m The four Teeth called Cutters.
nn The two dog teeth.
oo The rest of the Teeth called Grinders.





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Third line of handwritten text, continuing the narrative or list.

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Seventh line of handwritten text, continuing the list or description.

Eighth line of handwritten text, showing more detail.

Ninth line of handwritten text, possibly a concluding sentence for a section.

Tenth line of handwritten text, appearing as a signature or final note.

Eleventh line of handwritten text, showing the bottom of the main content area.

Twelfth line of handwritten text, possibly a footer or additional note.

Final line of handwritten text at the bottom of the page.

AN EXPLANATION OF THE TABLE
OF THE SIXTEENTH BRASSE
PLATE IN THIS BOOK.

This Table shews, the Brain laid bare from the Skull, with the *Dura* and
Pia Mater; also its Cavities and Processes.

FIG. I.

- AA* The *Dura Mater* covering the Brain.
aa The Veins and Arteries distributed on it.
B The Brain covered only with the *Pia Mater*.
bb The Circumvolutions of the Brain.
ccc The Vessels distributed to the *Pia Mater* from the third Cavity.
c The *Dura Mater* drawn backwards.

FIG. II.

- AA* The longer Process of the *Dura Mater* called Falx, turned out of its Situation.
aa The third cavity of the *Dura Mater* open.
bb The lesser inferior cavity of the same.
BB A portion of the callous body laid to view.
CCCC The brain deduced a little to the sides.
cccc The vessels in the fourth cavity, stretched over the callous body.
DD The *Dura Mater* hanging down on each side.

FIG. III.

- AA* The substance of the Brain.
BB The callous body drawn a little outwards.
bb The two Legs of the Vault something uncovered.
c The hooklike process drawn backwards.
DD The right fore ventricle opened on the upper part.
EE The left fore Ventricle opened on the upper part.
FF The Plexus Choroides.
G Part of the Speculum Lucidum.
HH The *Dura Meninx* detracted on each side.

FIG. IV.

- AA* The brain explained by equal Section.

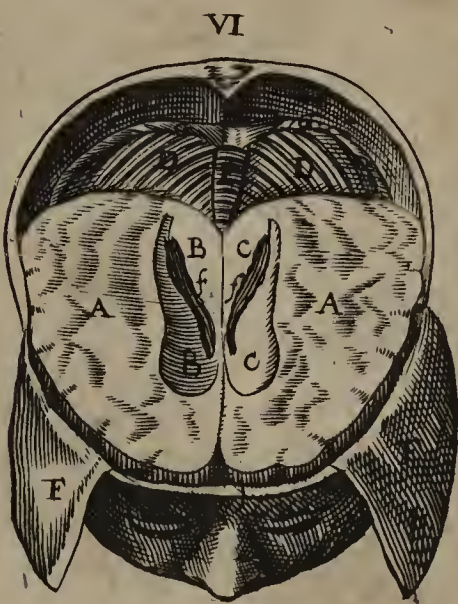
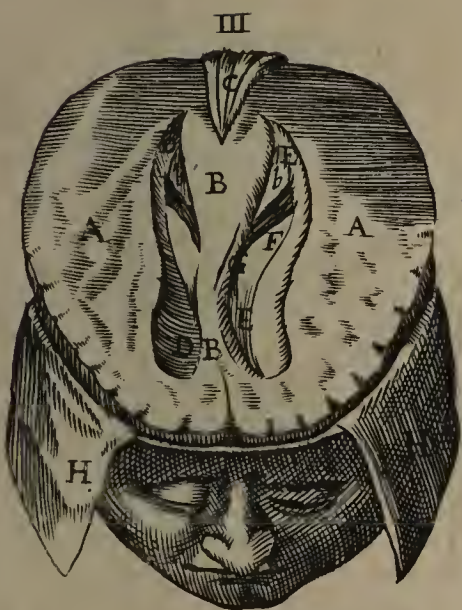
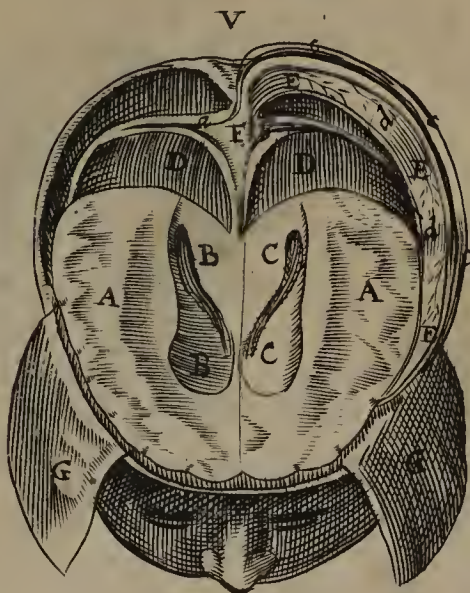
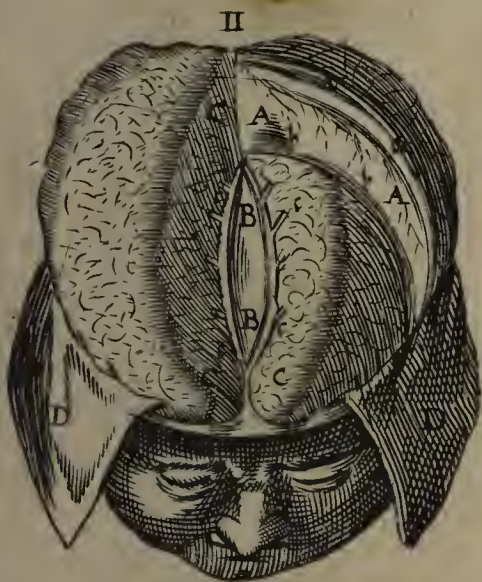
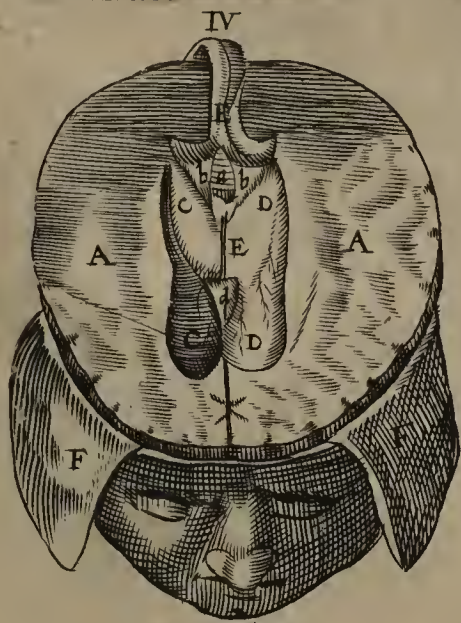
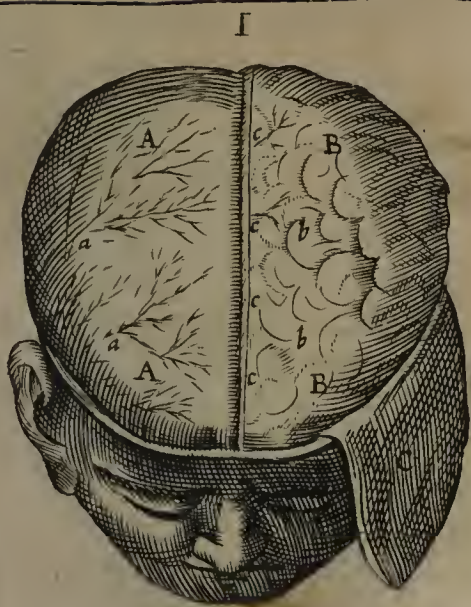
- B* The Fornix taken up and bowed downwards.
CC The superior part of the right fore ventricle deduced.
DD The superior part of the left fore ventricle in like manner explained.
E The chink designing the third Ventricle.
FF The *Dura Mater*.
a The Glandula Pinealis.
bb The Protuberances, called Buttocks.
cc The Protuberances called Testicles
d The Protuberance likened to a womans Privities. These are better expressed in the first Figure of the following Table.

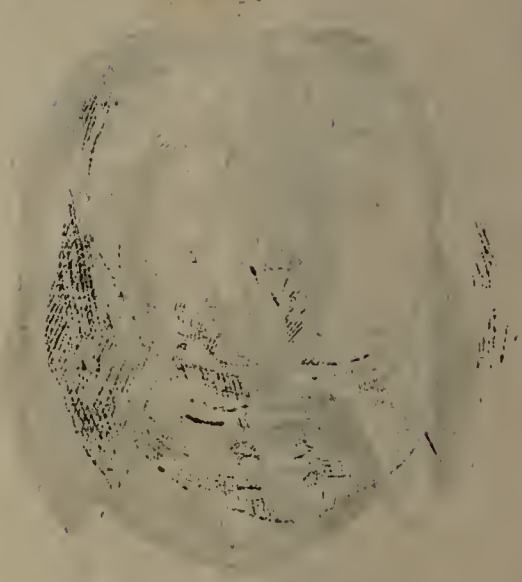
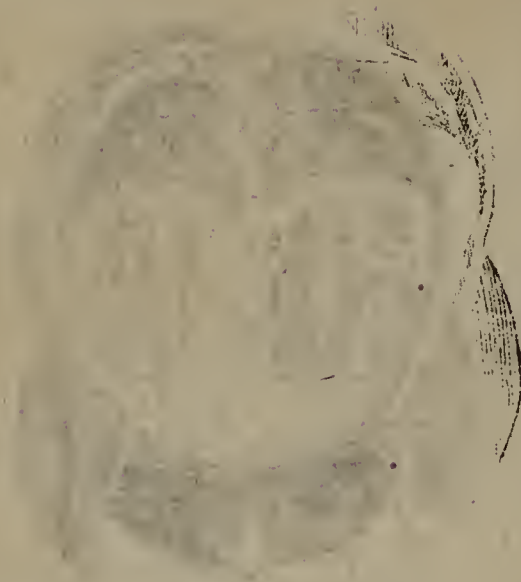
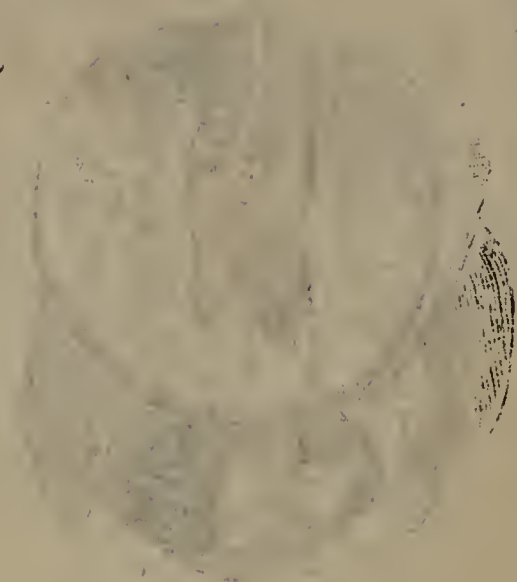
FIG. V.

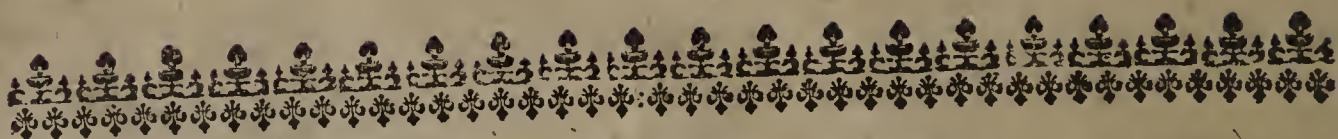
- AA.BB.CC.* The brain and foremost ventricles explained in their upper part.
f A portion of the Plexus Choroides stretched upwards by the foremost ventricles
D The shorter process of the *Dura Mater*.
EEE The longer process thereof.
F The Torcular of Herophilus.
G The *Dura Mater* detracted.
a The first cavity of the *Dura Mater*.
b The second cavity of the *Dura Mater*.
ccc The third cavity of the *Dura Mater*.
ddd The lesser cavity in the hooklike process.
e The fourth cavity of the *Dura Mater*.

FIG. VI.

- AA BB CC ff* signifie the same they did in the first Figure.
DD The Cerebellum conspicuous in his natural place.
E The wormlike process of the Cerebellum.
FF The *Dura Mater* hanging down.
GG The same with the cavities rowled downwards.







AN EXPLANATION OF THE TABLE OF THE SEVENTEENTH BRASSE PLATE IN THIS BOOK.

This Table presents in larger Figures the Cavities both of the Brain and *Cerebellum*, as they are shewed by the Dissections of the Ancients.

FIG. I.

Shews the inferior Cavity of the foremost Ventricles of the Brain, the original of the optick Nerves, the fourth Ventricle with its Protuberances, the Legs of the Vault, and whatsoever *Arantius* compared by the *Sea-horse*, or *Silk-worm*.

AAAA	The Dura Mater detracted.				bellum commonly called the fourth ventricle.
B	The Proceß of the sieve-like Bone like a crist.			0000	Part of the Plexus Chorois bowed backwards, which is carried by the superior cavity of the ventricles.
CC	Part of the Os Sphenois, shewing it self under the membrane, the Brain being taken away.			PP	The foremost portion of the Basis of the Brain.
DD	The foremost proceß of the Os Sphenois, making the Cavity of the Saddle.			Q	The bottom of the third ventricle in which behind is the hole likned to the Fundament; it tends to the beginning of the marrow of the back; before is the hole compared to the womb, and is carried to the Funnel.
EEEE	A portion of the Brain left.				
F	The foremost leg of the Vault bowed forwards.				
GG	The hinder legs of the Vault.				
HH	The <i>Sea-horse</i> , or <i>Silk-worms</i> of <i>Arantius</i> .			RRRR	A portion of the Plexus Chorois turned backwards, which is extended to the fourth inferior cavity.
III	The inferior Cavity of the foremost ventricles.				
K	The extremity of the callous body sticking out like Buttocks.			SS	The roots of the optick Nerves.
L	The Glandula Pinealis.			T	The uniting of the optick Nerves.
MM	The Protuberances called Testicles.			UU	The optick Nerves again severed and passing towards the Eyes.
NN	The cavity between the Brain and Cere-				

FIG. II.

This Figure shews the proper Ventricle of the *Cerebellum*, which the best Anatomists call the fourth Ventricle.

AAAA	Each lobe of the <i>Cerebellum</i> whol.	E	The prominence conspicuous between the two cavities.
BBBB	The internal face of the <i>Cerebellum</i> laid open by incision.	F	The passage from the third ventricle to the marrow of the back.
CC	The worm-like Proceß of the <i>Cerebellum</i> whose superior and round part is taken away.	G	The Cavity of the marrow of the back like a pen.
DD	The proper Ventricle of the <i>Cerebellum</i> , with its two cavities.	H	The chink in the said cavity.
		II	The descending trunk of the marrow of the back cut off.

FIG:

I.

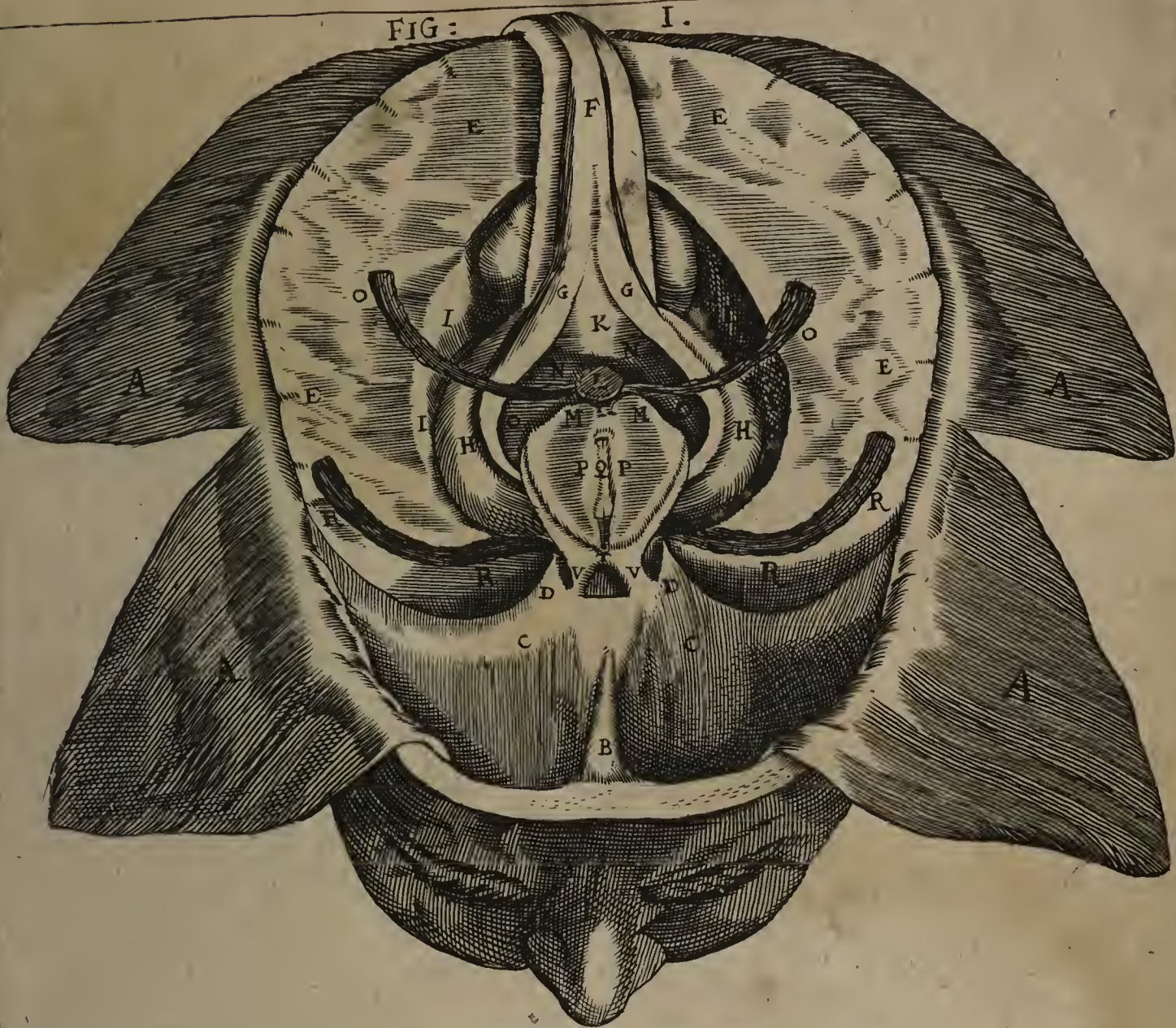
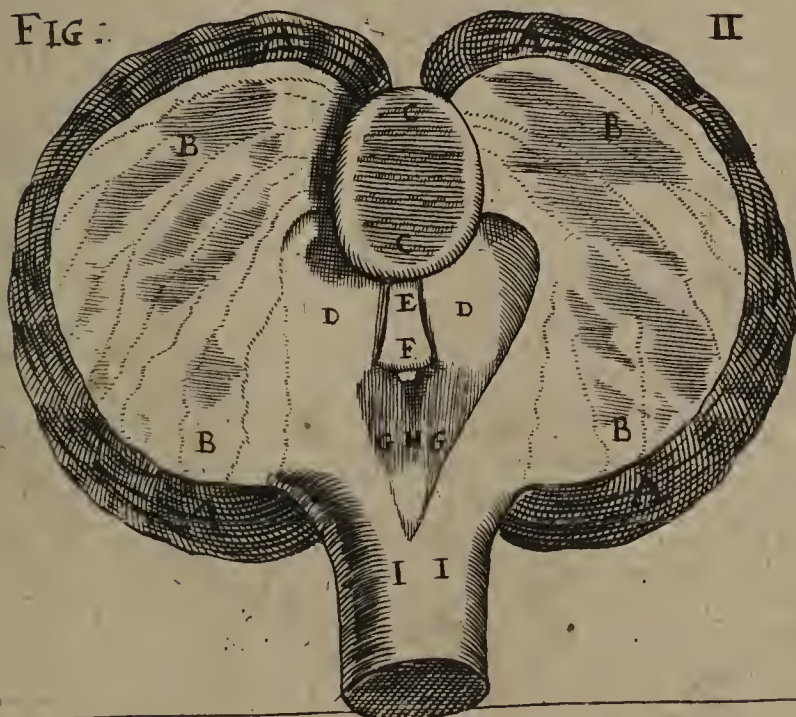


FIG:

II



1912

AN EXPLANATION of the TABLE of the twentieth brass Plate in this Book.

This Table represents the external Ear with his Muscles and Cartilages, as also the internal or chief Organ of Hearing, its Cavities, Bones, Passages and Nerves, as they are found out by Dissection of such Bodies as are grown up.

FIG. I.

Shews the external Ear whol, with its muscles and Cavities.

AA The Helix of the Ear.

BB The Anthelix.

C The Tragus, or beard of the Ear.

D The Antitragus.

E The external lobe of the Ear.

FF The external Concha of the Ear.

GG The cavity between the Helices called Innominata.

H The muscle moving the Ear right upwards.

III The three-fold muscle with his tendon moving the Ear oblickly upwards, divided into so many parts.

FIG. II.

Shews the external Ear conspicuous behind.

AA The skin with the Membrane stretched upwards and downwards.

BB The Cartilage which makes the Ear.

C The hole for the passage of hearing.

D A portion of the Ligament of the external Ear.

E Part of the Lobus of the Ear.

FIG. III.

Shews the fore part of the internal Ear.

A Part of the bone of the Temples containing the rocky process.

B The passage of hearing.

C The beginning of the passage or hive.

D The duglike process.

E The bodkinlike process broken off.

FIG. IV.

The bone of the fore-going Figure is shewed, in which the passage of hearing is cut off, that so the membrane of the Tympanum may be seen.

AA The beginning of the passage of hearing.

BB The membrane of the Tympanum.

C The little foot of the Malleus transparent by the membrane.

D The duglike process.

E The bodkinlike appendix.

FIG. V.

Shews the Muscles of the internal Ear.

A The muscle moving the membrane and Malleolus outwards.

B The membrane of the Tympanum.

CC The muscle moving the Malleolus and membrane inwards.

E The head of the Malleolus.

FIG. VI.

A Part of the passage of Hearing passing to the Tympanum.

B C The cavity of the Tympanum, in which

B The oval hole.

C The round hole.

FIG. VII.

Shews the rocky process with the small bones of the Tympanum in their situation.

A The Malleolus.

B The Anvil.

C The superior part of the stirrop conspicuous.

DD The bowing of the Cochlea.

FIG. 7.

Shews the three small bones out of their situation.

A The Malleolus with its two processes, its short and long.

B The Anvil applied to the Malleolus.

C The Stirrop.

D The small bone joyned to the Ligament of the stirrop.

FIG. VIII.

Shews the inferior face of the bone of the Temples.

AA The extremity of a quill thrust through that passage of Hearing which is carried to the pallet.

BB Shews the same passage broke off from the next part.

FIG. IX.

AA The cavity of the Cochlea, whose broader part goes to the Labyrinth.

BB The cavity of the Labyrinth, in which the oval hole is conspicuous:

also four other holes which open themselves in the circles are obumbrated by a black colour: the first in the extremity of the circle of the Cochlea, is broken off. If you would see how they are in Infants, look the eighth Table, and the seventh figure.

FIG. X.

AA The beginning of the passage of the first hole of the bone of the Temples, into which the Nerve of Hearing passeth.

BB The rocky process of the bone of the Temples, in which the cavities are contained.

FIG. XI.

ABCD The end of the passage into which the Nerve of Hearing proceeds laid open, the bone being taken away.

B The cavity in which the softer portion of the Nerve of Hearing lies in the Centre of the Cochlea.

C The process between each portion of the Nerve standing up like a bridg.

D Another cavity called Cæcum by the Ancients, Aquæductus by Fallopius, by which the harder portion of the nerve of hearing obliquely descends.

EE Two footsteps of the circles in the Labyrinth, which you may see whol, Table 8. figure 7, 8.

FIG. XII.

Contains a portion of the bone of the Temples, in which the Tympanum being taken away, and the passage which contains the Nerve of Hearing there appears.

AA The softer portion of the nerve of Hearing.

BB The harder portion of the nerve of Hearing, obliquely descending under the Tympanum, being thicker about the place it goes out.

CC A small Nerve from the fourth pair joyning it self to the harder nerve of Hearing.



AN EXPLANATION OF THE TABLE
OF THE EIGHTH PART
OF THE ACT

The Table here inserted is intended to explain the meaning of the words used in the eighth part of the Act, and to show the manner in which the same are to be applied to the facts and circumstances of each case.

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AN EXPLANATION OF THE TABLE OF THE EIGHTEENTH BRASSE PLATE IN THIS BOOK.

This Table shews the rise of the Nerves within the Skull, also the principal branches of the third and fourth pairs, the *Glandula Pituitaria* with the Funnel, the *Rete Mirabile*, the fourth Ventricle and the most special Veins arising from the marrow of the Back.

FIG. I.

Shews the Brain a great portion of it being taken away above with the *Cerebellum* diducted to the side.

- A** The Nerve of smelling.
- a** Its process called *Mamillaris*.
- B** The Optick Nerve or first pair.
- CC** The Nerve of the second pair.
- DD** The Nerve of the third pair.
- EE** The Nerve of the fourth pair.
- FF** The Nerve of the fifth pair.
- GG** The Nerve of the sixth pair. The Nerve of the seventh pair by reason of its deep rise appears not.

FIG. II.

The side of the skull being broken off, together with the Eye whol, and the cheek divided, is shewed.

- A** The Nerve of the third pair.
- B** Its branch which goes out at the hole of the bone of the forehead.
- C** A branch of the same pair which goes out by the hole of the fourth bone of the upper Jaw.
- D** The Nerve of the fourth pair.
- E** Its branch which goes to the teeth and gums of the upper Jaw.
- F** Its branch which is carried to the Tongue.
- G** Its branch which enters the lower Jaw.
- H** The same branch which passeth out at the hole of the lower Jaw.

FIG. III.

The Brain with the Marrow of the back being turned, these things come to view.

- AA** The Nerves of swelling.
- aa** Their Dug-like processes.
- BB** The two legs of the Nerves of the first pair.
- CC** The greater branch of the Artery *Carotis*, the interior being joyned to the Vertebral Artery **OO**
- D** The *Glandula Pituitaria*.
- E** The Funnel.
- F** The Protuberances of the Brain, set before the passage which carries the slegm to the Funnel.
- GG** The Nerves of the second pair cut off.
- HH** The beginnings of the Nerves of the third pair.
- II** The beginning of the Nerve of the fourth pair.

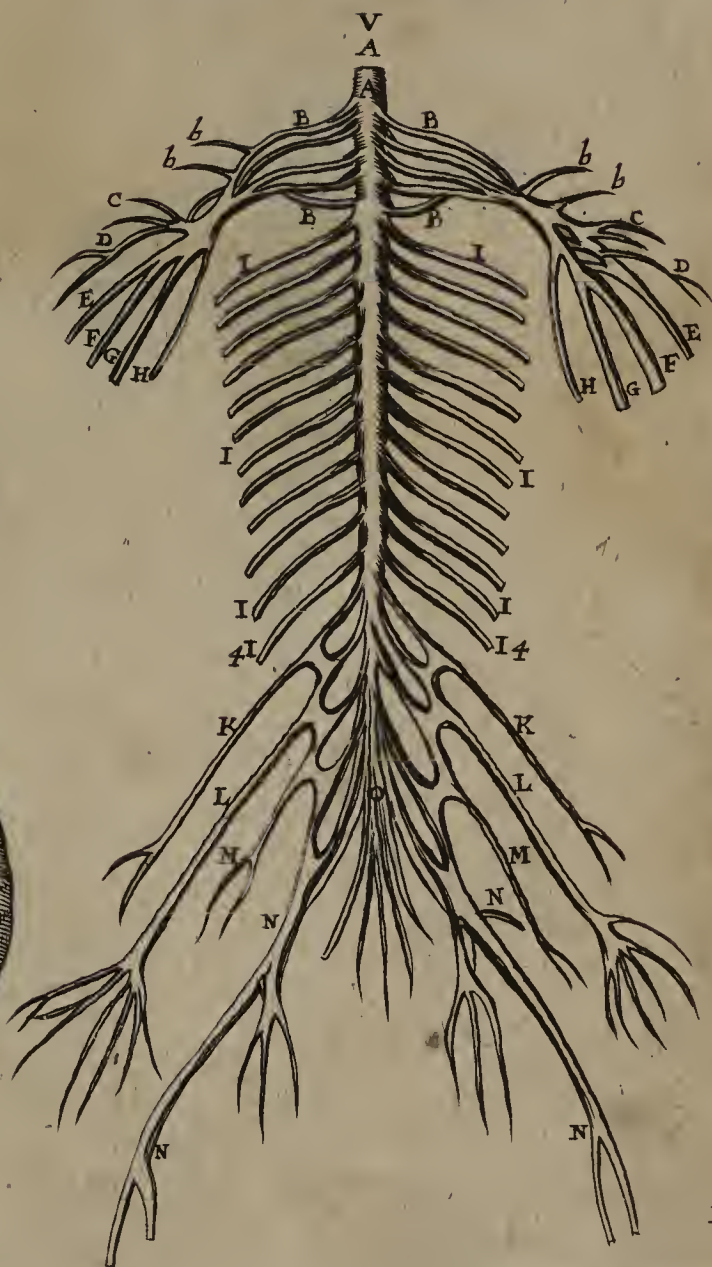
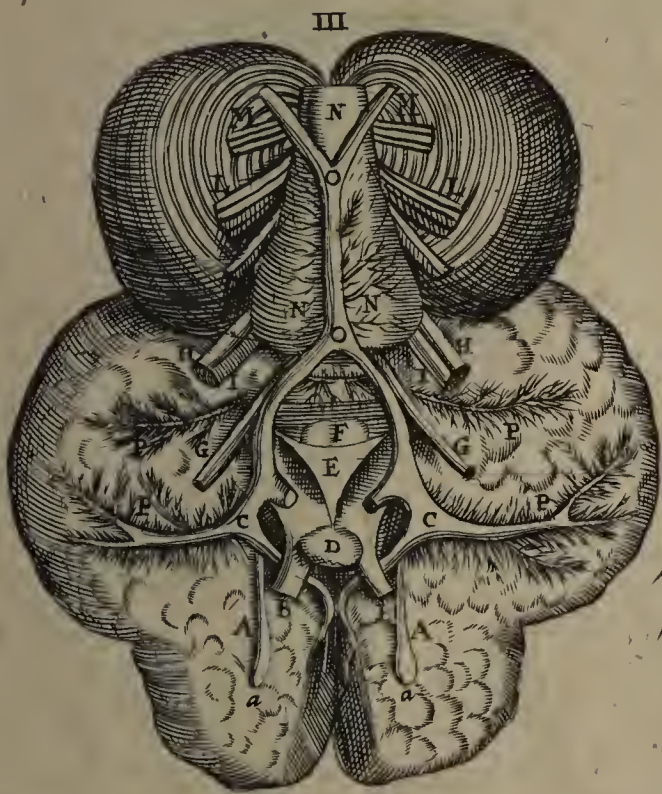
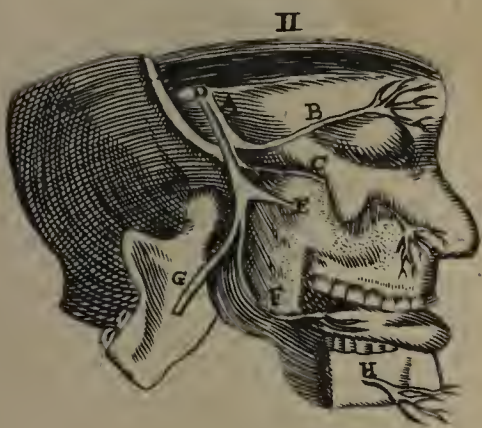
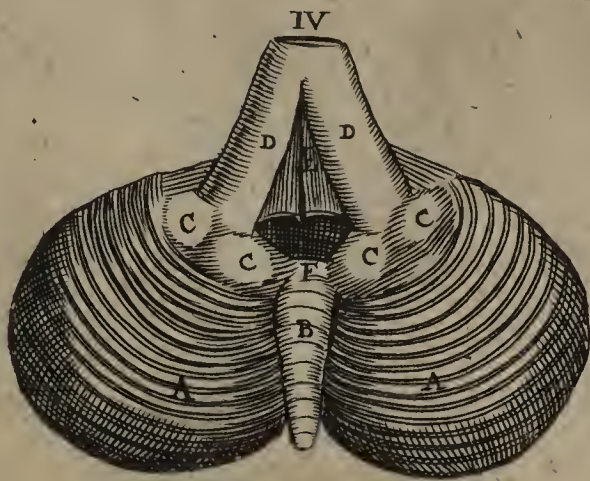
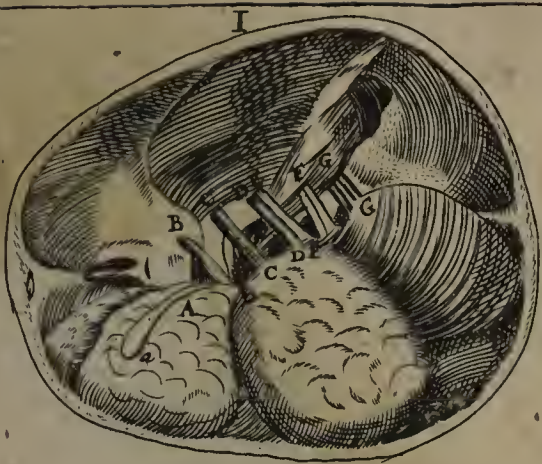
- KK** The beginning of the Nerves of the fifth pair.
- LL** The beginning of the Nerve of the sixth pair.
- MM** The beginning of the Nerve of the seventh pair.
- NNN** The beginning of the marrow of the back, between the skull and the first Vertebra.
- OO** The common branch of the Vertebral artery, which being divided after its union with the *Carotis* artery **CC** makes up the *Rete mirabile* with it, about the seat of the Wedg-like bone.
- PPPP** Small branches of Arteries called the *Rete mirabile*.

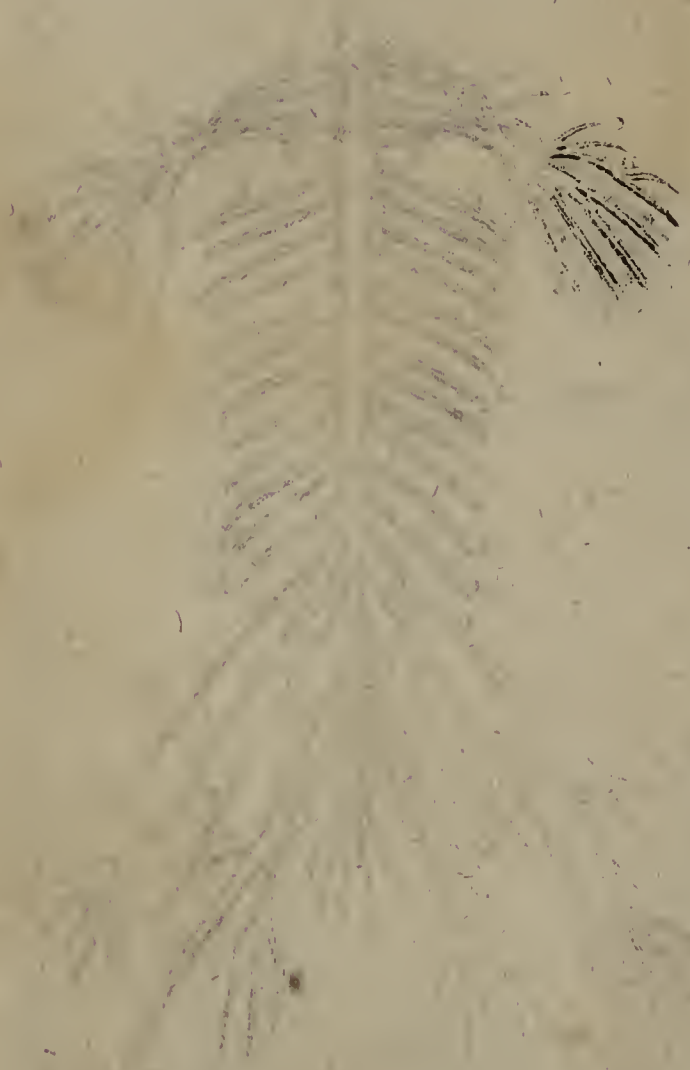
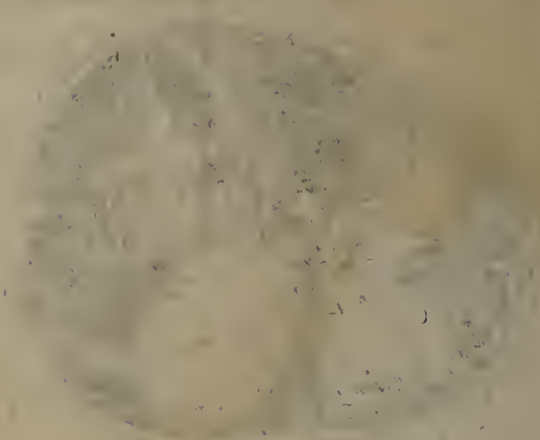
FIG. IV.

- AA** The *Cerebellum* and his globes.
- B** The wormlike process of the *Cerebellum*.
- CCCC** The process of the *Cerebellum*, called the bridg.
- DD** The beginning of the marrow of the back.
- E** The cavity of the marrow of the back, called the pen.
- F** The fourth Ventricle laid open.

FIG. V.

- A** The trunk of the marrow of the back descending as it may be publicly shewed being taken out of the body.
- BB** The branches arising from the three pairs of Nerves of the Neck, and two of the Breast, to be distributed to the hands.
- bb** The small branches running to the muscles of the shoulder.
- CC** The first pair of Nerves of the hands.
- DD** The second pair.
- EE** The third pair.
- FF** The fourth pair.
- GG** The fifth pair.
- HH** The sixth pair called *Subcutaneus*.
- IIII** The pairs of intercostal Nerves, the two lowermost of which pertain to the Loyns.
- K** The first pair which is carried to the Foot.
- LL** The second pair.
- MM** The third pair.
- NN** The fourth and greatest pair.
- O** The small Nerve of the marrow of the back, which are carried to the bladder and muscles of the Fun dament, and to the Genitals of both Sexes.







AN EXPLANATION OF THE TABLE of the nineteenth Brass Plate in the Book.

This Table comprehends the following:—
proper Minutes of the Days; the
intercalary Days of the Months.

FIG. I.

- AA The Eastern angle of the Table.
- BB The Western angle of the Table.
- CC The Northern angle of the Table.
- DD The Southern angle of the Table.
- EE The Eastern angle of the Table.
- FF The Western angle of the Table.

FIG. II.

- AA The Eastern angle of the Table.
- BB The Western angle of the Table.
- CC The Northern angle of the Table.
- DD The Southern angle of the Table.

FIG. III.

- AA The Eastern angle of the Table.
- BB The Western angle of the Table.
- CC The Northern angle of the Table.
- DD The Southern angle of the Table.
- EE The Eastern angle of the Table.
- FF The Western angle of the Table.
- GG The Northern angle of the Table.
- HH The Southern angle of the Table.

FIG. IV.

- AA The Eastern angle of the Table.
- BB The Western angle of the Table.
- CC The Northern angle of the Table.
- DD The Southern angle of the Table.
- EE The Eastern angle of the Table.
- FF The Western angle of the Table.
- GG The Northern angle of the Table.
- HH The Southern angle of the Table.

AN EXPLANATION OF THE TABLE
of the nineteenth Brass Plate in this Book.

This Table comprehends the Eye-lids with the Muscle called *Levator*; also the proper Muscles of the Eyes; the Membranes and the Humors included in the Membranes.

FIG. I.

- AA The Levator muscle of the superior Eye-lid.
B Its tendon thinly opened.
CC The Cartilages of the Eye-lids.
DD The Caruncle in the internal angle.
dd The Puncta Lacrymalia.
E The external angle of the Eye-lid.

FIG. II.

- AA The Fat behind the Eyes.
BBB The muscles of the Eyes not separated.
CC Part of the Eye covered with the tendons of the muscles.

FIG. III.

- A The right muscle lifting up the Eye.
aaa &c. Small Nerves carrying motion, sense, and Spirit.
B The right muscle depressing the Eye.
C The right muscle drawing to the Eye.
D The right muscle drawing the Eye from.
E The inferior oblique muscle, whose tendon is but only separated from the part of that which follows.
F The superior oblique muscle.
G The Trochlea of the same muscle.
H The Sclerotes covering the hinder part of the Eye.
II A portion of the Optick Nerve inserted into the Eye.

FIG. IV.

Shews a Sheeps Eye, and in it the seventh muscle which Man needs not.

- ABCD The four right muscles.
E The inferior oblique muscle, which here is large.
F The superior oblique muscle which is slender.
G The Trochlea of the superior oblique muscle.
H The seventh muscle of Brutes drawing the Eye to.
I The hinder part of the Eye covered with the ten-

don of the seventh muscle.

- K A part of the optick Nerve included in the seventh muscle.

FIG. V.

- ABCD Shew the same with the former, the oblique muscles being removed.
aaaa The common membrane called Innominata.
bb The Iris transparent through the Cornea.

FIG. VI.

- AAA The Membrane Sclerotes dissected.
B The Membrana Cornea.
C A part of the optick Nerve.

FIG. VII.

- A The Membrana Uvea.
a The hole in the Uvea or Pupilla.
BB The Ciliar Ligament with its strings.
CC The Membrana Choroides looking black.

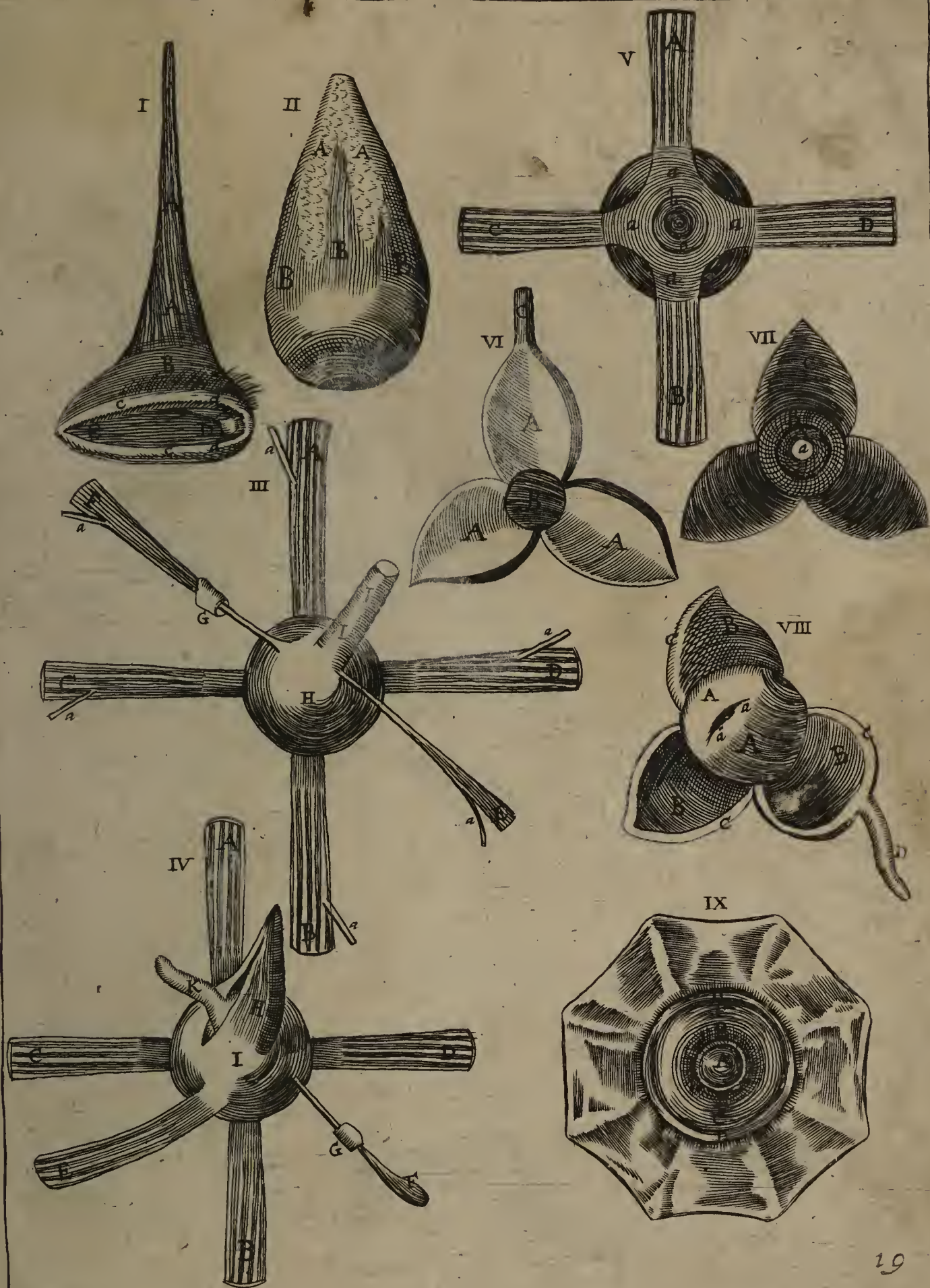
FIG. VIII.

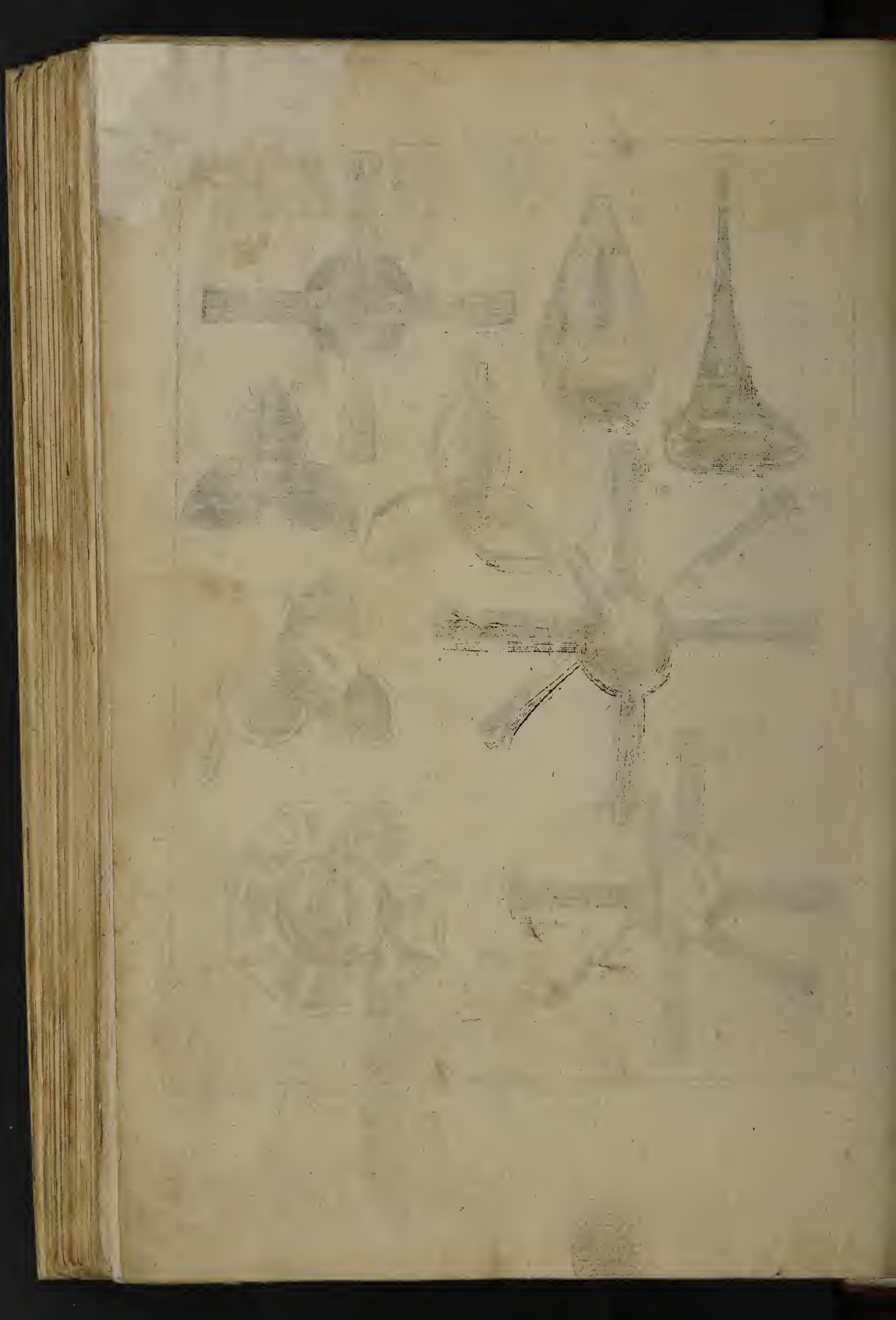
- AA The Net-like Membrane.
aa A Rupture in it upon the Vitreal, which by reason of its softness is unavoidable in a Dissection.
BBB The Membrana Choroides not yet separated.
CCC The thickness of the Membrane Sclerotes.
D Part of the optick Nerve.

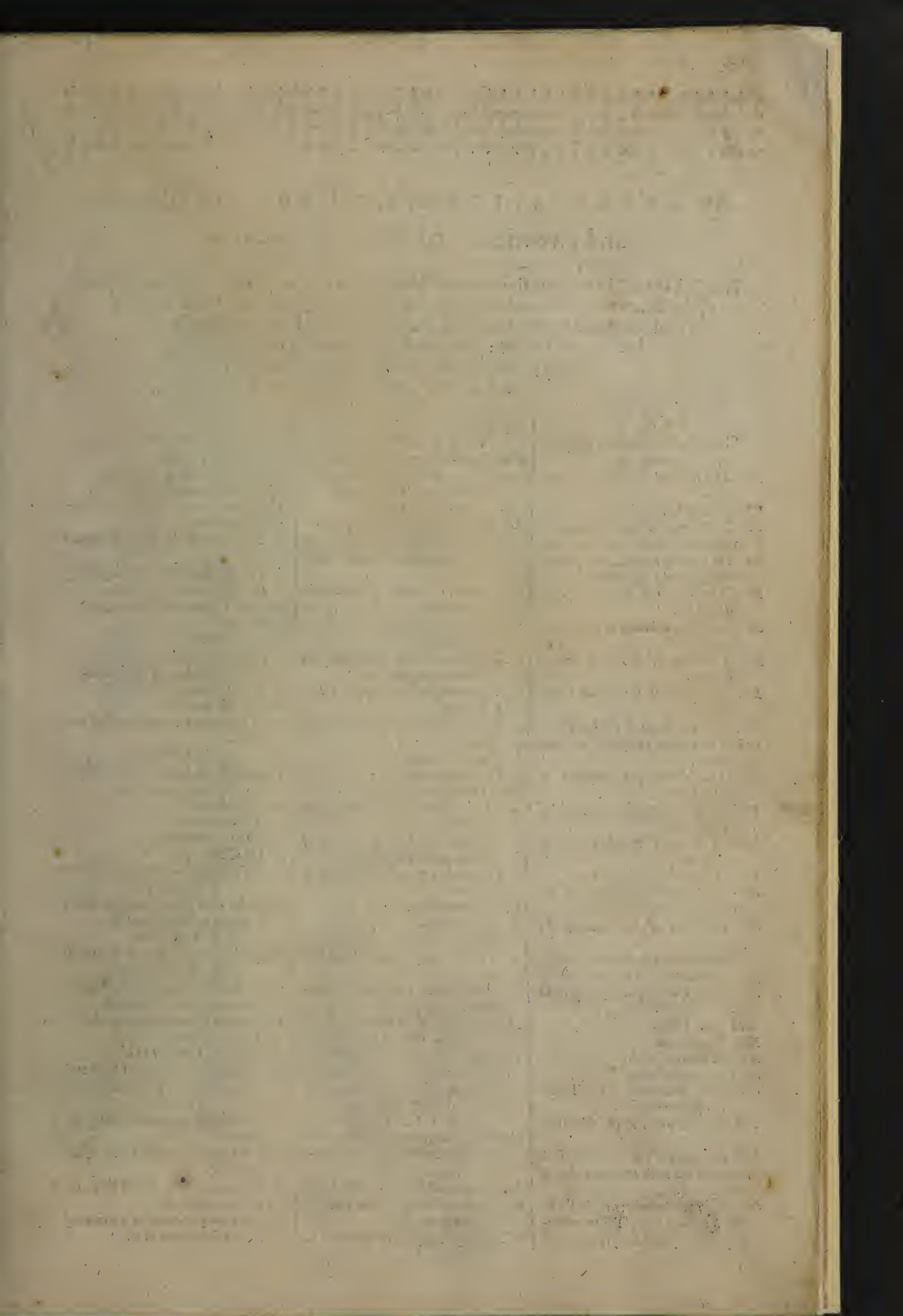
FIG. IX.

The three humors of the Eyes received in a Vessel.

- A The Crystalline Humor posited in the Cavity of the Vitreal.
BB Some appearance of the Ciliar strings.
CC The Vitreal humor.
DD The aequal humor, being but little, and placed round about the Vitreal.







An EXPLANATION of the TABLE of the one and twentieth Brass Plate in this Book.

This Table exactly presents the Bones of Man to your view, so that the Composition of the Bones we mentioned before in the *Abdomen*, *Breast*, and *Head* are here seen, especially the Bones of the *Hands* and *Feet* are seen both before and behind; also the *Ligaments* of the *Thigh* and *Tibia*; lastly, the Bones called *Sesamoides* are curiously represented.

F I G. I.

Shews the *Skeleton* of a Body
grown up.

- AA The internal side of each *Scapula*.
- BB Both the *Claviculae*.
- CC The bone of the *shoulder*, otherwise called the bone of the *arm*.
- aa The head of the *shoulder* produced from the *appendix*.
- bb The external bunch of each *shoulder*.
- cc The internal bunch of the *shoulder*.
- DD The bone of the *Cubit* called *Radius*.
- EE The bone of the *Cubit* called *Ulna*.
- FF The eight bones of the *Carpus*.
- GG The *thumb* composed of three bones.
- HH The *Metacarpus* composed of four bones.
- II The four *fingers* composed of three bones.
- KK The *thigh* which some call *Crus*.
- LL The *Mola*, or *Knee-pan*.
- dd The head of the bone of the *thigh*, or *superior appendix*.
- ce The neck of the bone of the *thigh*.
- ff *Trochanter*, or *Rotator major*.
- gg *Trochanter*, or *Rotator minor*.
- hh The *appendix*, or *inferior head* of the *thigh*.
- MM The *Tibia*.
- NN The *Fibula*.
- ii The *internal angle*.
- kk The *external angle*.
- OO The seven bones of the *Tarsus* conspicuous before.
- PP The five bones of the *Metatarsus*.
- QQ The bones of the *toes*, of which the great toe hath two, and the rest three apiece.
- ** &c. The *appendices* of the *shoulder*, *Radius*, *Thigh*, *Tibia*, distinguished by a small line from the rest

of the bone.

F I G. II.

Contains the *Scapula* with the *Clavicula*, to which the bones of the *Shoulder*, *Cubit*, and *Hand* are joyned.

- A The left *Clavicula*, in which
- a The head which is lightly sinewous where it is committed to the *Sternum*.
- b The other extremity of the *Clavicula*, whereby it is joyned to the process of the *Scapula*.
- B The *Scapula*.
- c The short process of the *Scapula* receiving the *shoulder*.
- d The process of the *Scapula* called *Coracois*.
- e The process of the *Scapula* called *Spina*.
- f The *superior angle*.
- g The *inferior angle*.
- hh The basis of the *Scapula*.
- C The notable hinder bone of the *shoulder*.
- f The greater or backward cavity of the bone of the *shoulder*.
- g The crooked process of the bone of the *Ulna*.
- D The bone *Ulna*.
- E The *Radius*.
- F The external face of the *wrist*.
- G The *Metacarpus* consisting of four bones.
- H The *Thumb* consisting of three bones.
- II The orders of the *fingers*.

F I G. III.

Contains the eight bones of the *Wrist* expressed largely, that so they might be the better distinguished.

F I G. IV.

Shews the *Os Ischium*, *Ilium*, and *Pubis*, and under them, the *thigh leg*, and *Foot*.

- A The external face of the *Os Ilium*
- B The *Acetabulum* which receives the head of the *thigh*.
- C The *thigh* conspicuous behind, in

which

- a The *superior appendix*.
- b *Trochanter major*.
- Δ The rough line of the *thigh*.
- c *Trochanter minor*.
- d The posterior cavity of the *inferior appendix*.
- ee The heads of the *inferior appendix*.
- f The protuberances distinguishing the cavities of the *Tibia*.
- D The *Tibia* conspicuous behind.
- g The *internal angle*.
- E The *Fibula*.
- h The *external angle*.
- ** The *appendices* of the *Tibia*.
- F The *Tarsus*.
- G The *Metatarsus*.
- H The great toe consisting of two bones.

F I G. V.

Propounds the bones of the *Tarsus* distinctly, in which

- A *Os Astragali*.
- B *Os Calcanei*.
- C *Os Cymbiforme*.
- D *Os Cubiforme*.
- EEE The three other wedlike bones.

F I G. VI.

Shew the four greater and four lesser bones called *Sesamoides*.

F I G. VII.

Shews the superior part of the *thigh* with the *Acetabulum*.

- aa A broad *Ligament* compassing the joint of the *thigh* dissected.
- b A round *Ligament* arising out of the *Acetabulum*.

F I G. VIII.

The inferior part of the *Thigh* and superior part of the *Leg* is shewed.

- a A broad *Ligament* compassing the joint.
- b A *Ligament* produced out of the *Sepiment*.
- cc The cavities of the *Tibia* receiving the *thigh*.
- d The *knee-pan* with a portion of the tendon joyned to it.



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AN EXPLANATION OF THE TABLE of the two and twentieth Brass Plate in this Book.

This Table comprehends the Muscles which move the Shoulder, Cubit, and Hand :
of which the greater part stick to their beginnings and ends,

FIG. I.

- A* Musculus Deltoides separated from the beginning
- B* Infraclapularis separated.
- C* Rotundus minor.
- D* Rotundus major.
- E* The pectoral muscle separated from the breast, vide Chap. ix.
- F* The fleshy portion of the broadest muscle of the back, vide Chap. xii.
- G* Musculus Biceps.
- H* The lesser muscle lifting up the shoulder in his situation.
- II* The Brachizus under the Biceps.
- K* The muscle Palmaris hanging from its original.
- L* A portion of the Supinator.
- M* The external bower of the wrist.
- N* The internal bower of the wrist.
- O* The bower of the second Internodium of the fingers.
- P* The bower of the third Internodium of the fingers.
- Q* The bowers of the first Internodium of the thumb in their first situation.
- R* The bowers of the second Internodium of the thumb in their situation.
- S* The Abductor of the little finger.
- aa* The internal face of the Scapula.
- b* The tendon of the muscle Palmaris.
- c* A portion of the tendon which bows the third Internodium of the thumb.
- d* The Ligament of the wrist in its situation.

FIG. II.

- A* The lesser muscle lifting up the shoulder.
- B* The muscle Brachizus whole.
- C* The round Pronator of the Radius.
- D* The bower of the third Internodium of the thumb out of his situation.
- E* The square Pronator of the Radius.
- F* The bowers of the first Internodium of the thumb out of their situation.
- G* The bowers of the second Internodium of the thumb out of their situation.
- aa* The internal side of the Scapula.
- b* Os Humeri.
- c* Os Radii.
- d* Os Ulnæ.
- ec* The membranous Ligament of the Ulna and Radius.
- ffff* The muscles commonly called Adductors.
- b* The Abductor of the little finger.

FIG. III.

- A* The first Suprascapularis removed out of his place.
- B* The second Suprascapularis.
- C* Rotundus minor.

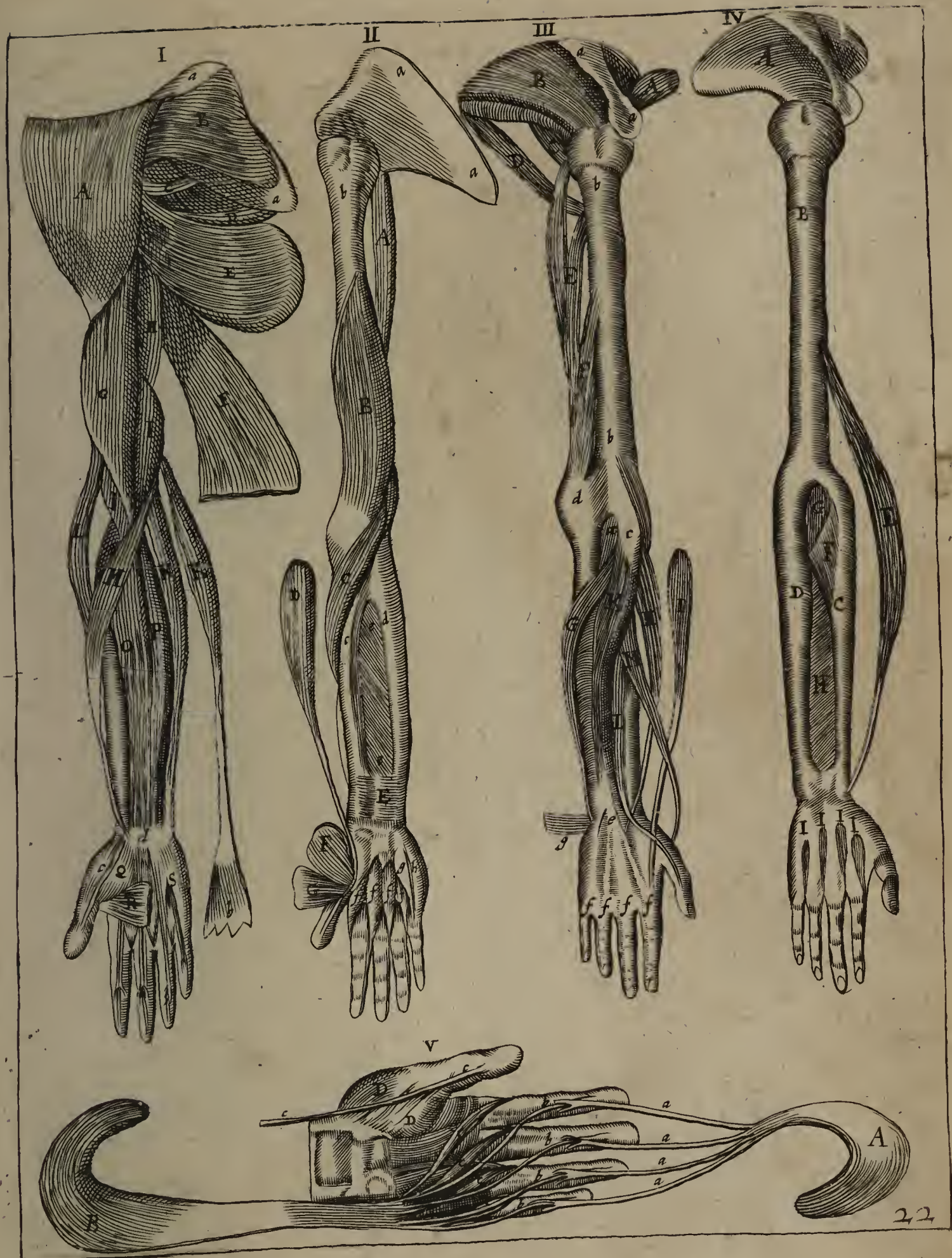
- D* Rotundus major.
- E* The long muscle extending the Cubit.
- F* The short extender of the Cubit.
- G* The internal extender of the wrist.
- H* The external extender of the wrist, having here but one tendon.
- I* The special Abductor of the fore finger with but one tendon.
- K* The extensors of the second and third Internodij of the fingers united.
- L* The extensor of the third Internodium of the thumb.
- M* The extensor of the first Internodium of the thumb, having here but one single body and tendon.
- aa* The process of the Scapula called Spiniformis.
- a* The muscle Anconeus.
- bb* The bone of the shoulder.
- c* The external knob of the shoulder.
- d* The internal knob of the shoulder.
- e* The tendines which extend the second and third Internodium gathered together.
- ff & c.* The tendons of the same muscles applying to the Internodij.
- g* The annular Ligament of the wrist loosed.

FIG. IV.

- A* The external face of the Scapula.
- B* The bone of the shoulder covered with the Periostium.
- C* Os Radii.
- D* Os Ulnæ.
- E* The muscle of the Radius called Supinator longus.
- F* The muscle of the Radius called Supinator brevis.
- G* The muscle Anconeus.
- H* The membranous Ligament of the Radius and Ulna.
- III* The three interosseal muscles with their Auxiliary.
- K* The Abductor of the thumb.

FIG. V.

- A* The muscle bowing the second Internodium of the fingers called Perforatus.
- aa & c.* Their tendons.
- B* The muscle bowing the third internodium of the fingers called Perforans.
- bb* Its tendines passing through the clefts of the tendines of the former.
- cccc* The muscles bowing the first Internodium, or Lumbricals.
- DD* The bowers of the thumb in their situation.
- cc* A portion of the tendon bowing the third internodium of the thumb.



Edward Cooper

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AN EXPLANATION OF THE TABLE of the three and twentieth Brass Plate in this Book.

This Table shews the Muscles produced by Nature for the various motions of
the Thighs, Legs, and Feet.

F I G. I.

- A* The greater part of the muscle called Psoas, which you may see in Table x. figure 1. in its Natural scituation, here it is separated from its beginning, and joyned to the internal Iliack muscle, and descends to the thigh.
- B* The internal Iliack muscle.
- CC* The muscle Triceps something uncovered: you may see it whol in the next Figure.
- D* Musculus Lividus.
- E* The membranous muscle conspicuous with a fleshy body about his beginning, whose broad tendon is separated from the parts under it.
- FF* The right muscle.
- GG* Musculus vastus externus.
- HH* Musculus vastus internus.
- II* Musculus facialis.
- K* Musculus Tibialis anticus.
- LL* Musculus Peroneus secundus.
- MM* The Extensor of the third internodium of the toes.
- N* The extender of the third internodium of the great toe.
- aa* The appendix of the Os Ilium laid open before.
- b* The extremity of the Os Pubis.
- cccc* The tendon of the membranous Muscle.
- dd* A portion of the muscle Gasterocnemius hanging out, the leg being depressed: the third Figure shews it hanging out of its scituation under the character KK.
- e* The membranous Ligament of the Tibia and Fibula.
- ffff* The tendines of the muscles extending the third Internodium.
- g* The transverse Ligament of the foot separated.

F I G. II.

- A* The internal face of the Os Ilium.
- B* A portion of the great muscle Glutæus, which the following figure represents separated from the middle Glutæus.
- CCC* Musculus Triceps.
- DD* A portion of the Gasterocnemius and Soleus as yet joyned.
- EE* Tibialis posticus.
- FF* Peroneus primus.
- G* The extender of the second internodium of the toes in its scituation.
- aaaa* The interosseal muscles.

F I G. III.

- A* Glutæus major separated and depressed to the side.
- B* Glutæus medius in his scituation.
- C* Musculus Pyriformis.
- D* The fourth muscle moving the thigh about.
- E* Obturator internus entring the fleshy purse.

- FF* Musculus gracilis.
- GG* Musculus Seminervosus.
- HH* Musculus Semimembranosus elegantly expressed.
- III* Musculus Biceps.
- KK* The Gasterocnemius turned backwards, to whose beginnings two small bones called Sarsamoides stick.
- LL* Musculus soleus in his scituation.
- M* The little muscle called Plantaris.
- N* The tendon spread abroad from the heel under the soal of the foot.
- O* The Abductor of the great toe.
- P* The Abductor of the little toe.
- Q* The interosseal muscle pertaining to the little toe.
- aa* The brim of the Os Ilium.
- b* The fleshy purse.

F I G. IV.

- A* The internal face of the Os Ilium.
- B* Musculus Glutæus minor in his scituation.
- C* Musculus Glutæus medius out of his scituation.
- D* Musculus Pyriformis.
- E* The fourth muscle moving the thigh about.
- F* The external Obturator.
- G* The internal Obturator.
- H* The fleshy purse.
- I* Musculus Popliteus.
- II* Musculus perforans.
- K* The muscle bowing the third internodium of the great toe.
- L* Musculus perforatus in his scituation.
- M* The Abductor of the little toe.
- N* The Abductor of the great toe in his scituation.

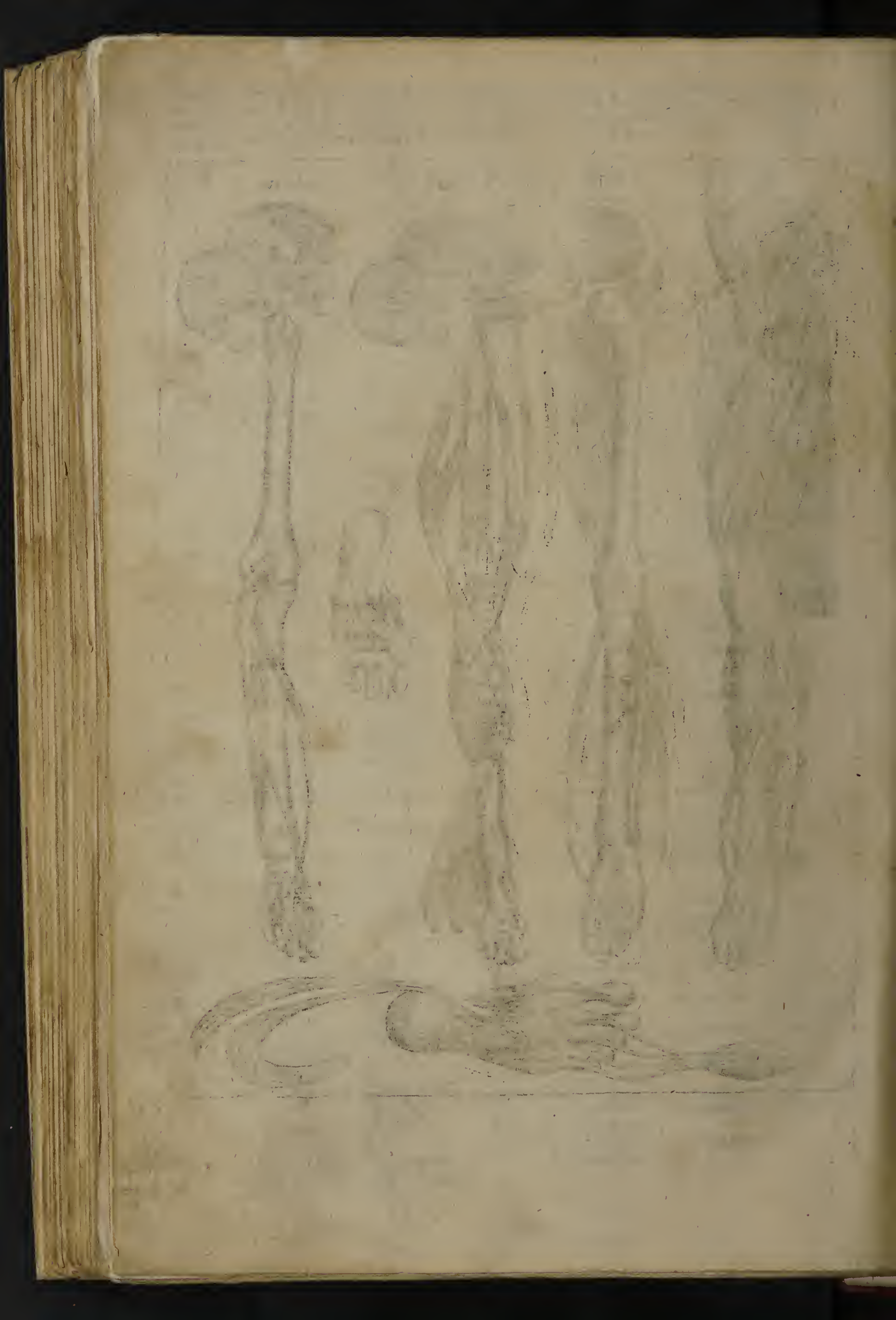
F I G. V.

- a* The greater Adductor of the great toe.
- bb* The Abductor of the great toe.
- c* The Abductor of the little toe.
- dddd* The internal interosseal Muscles.
- e* The lesser Adductor of the great toe.

F I G. VI.

- A* The muscle Perforatus which bows the second internodium.
- B* The bower of the third internodium of the great toe.
- C* Musculus perforans, or the bower of the third internodium.
- DD* A portion of the musculous flesh joyned to the beginnings of the lumbrical muscles.
- eeee* The lumbrical muscles.
- ffff* The interosseal muscles with the Abductors of the great and little toe.





AN EXPLANATION OF THE TABLE

of the four and twentieth Brass Plate in this Book.

This last Table shews the Veins, Arteries, and Nerves of the extreame Parts, being not carefull of the smallest branches, the huge multitude of which would obscure the greater, and dull the Brain of the Learner: The most famous are delineated, such as are shewed publickly in the Theater in Dissection of Men of perfect age.

FIG. I.

Shews the Veins distributed to the Hand.

- A* The axillar branch of the Vena Cava.
- BBB* Vena Cephalica.
- CCC* Vena Basilica.
- a* The external Scapular.
- b* The branch of the Cephalica, which is carried to the Deltois.
- c d* Branches of the Cephalica distributed to the bowers of the arm.
- e* The deep branch of the Cephalica.
- ff* The internal branch of the Cephalica making the Median.
- g* The Median vein descending.
- h* The Cephalica of the Hand.
- ii* The external branch of the Cephalica.
- æ* The Salvatella of the Hand.
- k* The internal Scapular.
- l* The superior breast-vein.
- m* The inferior breast-vein.
- mm* The Basilick branches carried to the Extensors of the Cubit.
- oo* The deep branch of the Basilica.
- p* A singular branch of the deep branch, which is carried out to the cubit, with the fourth pair of Nerves.
- q* The external branch of the deep basilical.
- r* The internal branch of the same.
- s* The Subcutaneous branch of the basilica.
- tt* The internal branch of the Subcutaneous branch, which with the cephalical, procureth the median.
- u* Its branch joyning it self to the common vein.
- x* The external vein of the Subcutaneous branch of the Basilica.
- yy* The greater branch of the external Subcutaneous.
- z* The lesser branch of the same.

FIG. II.

The Arteries distributed to the Arm.

- A* The axillar branch of the artery.
- a* The internal scapular.
- b* The external scapular.
- c* The superior Breast-artery.
- d* The inferior breast-artery.
- efg* Branches of the artery distributed to the muscles of the shoulder.
- hhh* Branches of the artery distributed to the joynt of the Elbow.
- B* The external branch of the artery in the cubit.
- C* The internal branch.

ii The branch which is carried to the muscles of the Radius.

k The branch carried to the muscles of the Ulna.

l m n o Branches carried from the internal branch to the wrist, little, ring and middle finger.

pp Branches carried to the hands from the external branch.

qq r s Branches pertaining to the thumb, fore, and middle finger.

FIG. III.

Designs the Nerves distributed to the hand.

4 5 6 7. The four Vertebrae of the Neck.

1. The first Vertebra of the breast.

a b c d The five Nerves proceeding out of the holes of the Vertebrae.

ff The first pair of Nerves descending from the plexure $\ast \ddagger$.

gg The second pair.

hh The third pair.

ii The fourth pair bigger than the rest.

kk The fifth pair.

ll The sixth pair which is subcutaneous.

FIG. IV.

Contains the veins of the foot.

A The crural branch of the Vena Cava.

aaaa The Vein Saphena.

bbb The branches of the Saphena distributed by the interior part of the thigh.

cc The Vein Ischias.

dd The internal Musculæ.

ee The external Muscula.

fff The vein Poplitea consisting of a double beginning.

gg The internal branch of the crural vein.

hh The external branch of the same.

i The first branch of the external crural.

kk The second branch of the same.

ll The remainder of the same.

m The vein of the foot called Ischias.

FIG. V.

Contains the Arteries of the Foot.

AAA The crural Artery produced from the external Iliack branch of the great Artery.

a The artery Pudenda.

b The artery carried to the internal Iliack muscle.

c The artery Ischias.

dd The external Muscula.

e The internal Muscula.

ffff The arteries distributed to the

membrane and fat.

gg The artery Poplitea.

hh The arteries called Surals.

ii The foremost branch of the crural artery.

kk The first hindmost branch of the same.

ll The second hindermost branch of the same.

FIG. VI.

Represents the Nerves of the Foot.

2.3.4.5. The four Vertebrae of the Loyns.

66 The Os Sacrum.

A A pair of Nerves pertaining to the tranverse muscles of the Abdomen.

BB The first pair of Nerves of the foot.

CC The second pair.

aaa A branch of the same which accompanies the Saphena.

bb The remainder of the same branch.

DD The third pair of of the Nerves of the foot.

EEE The fourth pair, which is the greatest.

c Its Branch which turns back to the Buttocks and skin of the thigh.

ddd Branches sent to the bowers of the leg.

eeee Branches sent to the bowers of the Thigh.

f A branch sent to the muscle Plantaris and the extensors of the Tarsus.

g.h Two external branches sent to the toes and the muscles of the Fibula.

i The internal branch carried to the great and second toe.

k.l The internal branches sent to the sural muscles.

m The remainder of the Nerve of the sixth pair, dispersed by a double branch under the foot to the toes.

FIG. VII.

Shews the Basilica vein open, in which three shutters appear.

FIG. VIII.

Shews a branch of the crural vein open, and three double; and one single shutter.

FIG. IX. and X.

Shew a portion of the Nerve of the fourth pair divided into smal Nerves like threeds, in gathering together of which, the wonderful power of Nature appears.



